Personality in Economic Decision Making
- An Interdisciplinary Approach -

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Abstract Deutsch

Ergebnisse experimenteller Studien widersprechen häufig den Vorhersagen ökonomischer Standardtheorie. Anstelle sich uneingeschränkt rational im Sinne eines homo oeconomicus zu verhalten und sich ausschließlich an der Maximierung des eigenen Nutzens zu orientieren, zeigen sich Personen anderen gegenüber kooperativ und teilen. Diese Befunde gelten selbst dann, wenn die Interaktionen anonym verlaufen und die Begegnungen einmalig sind, so dass eine Bildung von Reputationseffekten nicht möglich ist (für eine ausführliche Zusammenfassung siehe Fehr & Schmidt, 2006).

Vertreter der verhaltensorientierten Wirtschaftsforschung erweitern aus diesem Grund die Annahme strikter Rationalität und berücksichtigen den Einfluss psychologischer Faktoren wie z.B. sozialer Präferenzen und Reziprozität. Obwohl die Analyse von Entscheidungsverhalten sowohl Gegenstand ökonomischer als auch psychologischer Forschung ist, ist die Kooperation zwischen diesen beiden Disziplinen überraschend gering. Die psychologische Forschung akkumulierte innerhalb der vergangenen Dekaden ein umfassendes Wissen über die Messung von Persönlichkeitsunterschieden und über deren Einfluss auf Verhalten. Dennoch findet dieses Wissen bis zum heutigen Zeitpunkt sehr wenig Verwendung in ökonomischen Studien.

Die vorliegende Dissertationsschrift hilft, dieses Loch in der vorhandenen Literatur zu füllen. In einem bislang neuen interdisziplinären Ansatz wird die Expertise psychologischer und ökonomischer Wissenschaftler vereint. Kapitel 1 und Kapitel 2 zeigen, dass die Berücksichtigung von individuellen Persönlichkeitsunterschieden zum Verständnis von in ökonomischen Kontexten getroffenen Entscheidungen beitragen kann. Kapitel 3 bietet experimentelle Evidenz für die Notwendigkeit, psychologische Faktoren wie z.B. unterschiedliche Entscheidungsstile bereits während des Entscheidungsprozesses zu beachten. Kapitel 4 beschäftigt sich mit der Frage, wie Personen motiviert werden können, sich in einer sozialen Dilemmata Situation kooperativ zu verhalten.

Insgesamt erweist sich die Kombination von ökonomischen und psychologischen Methoden als vielversprechend, um Entscheidungsverhalten zu untersuchen. Die Berücksichtigung individueller Unterschiede und zugrunde liegender intrapsychischer Prozesse kann helfen zu erklären, weshalb sich Personen nicht als klassische homines

oeconomici verhalten und bietet Ansätze, wie individuell und kollektiv getroffene Entscheidungen verbessert werden können.

Individuelle Unterschiede,

Persönlichkeitsunterschiede,

Ökonomische Entscheidungen

Abstract English

Experimental findings on economic decision making are often at odds with predictions made by standard economic theory. Instead of behaving rationally in terms of the homo oeconomicus and being exclusively concerned with the maximization of own payoff, e.g., people give away substantial amounts of money to unknown others, even if interactions are anonymous and only once (for a comprehensive overview see Fehr & Schmidt, 2006).

Behavioral economists therefore relax the assumption of rationality and acknowledge the impact of psychological factors such as social preferences and reciprocity on decision making. Although decision making processes are intensely studied both by economic and psychological researchers, the collaboration between the two disciplines is surprisingly scarce. During the past decades psychologists acquired profound knowledge on the assessment of personality differences and on the influence of these differences on behavior. However, this knowledge is hardly applied to economic studies yet.

The present thesis helps filling this gap in the existing literature. Following a hitherto new interdisciplinary approach, economists' and psychologists' expertise is combined. Chapter 1 and Chapter 2 show that the consideration of individual predispositions in personality can contribute to understand how economic decisions are made. Chapter 3 provides evidence for the importance of paying attention to psychological variables such as the applied decision style during the process of decision making. Chapter 4 is concerned with the question how to motivate people to cooperate in a social dilemma situation.

Overall, the combination of economic and psychological research methods seems to be a promising way to study decision making. The consideration of individual

differences and underlying intra-psychic processes can help explaining why people do not behave as homines oeconomici and provides hints for the improvement of individually and collectively made decisions.

individual differences,

personality differences,

psychological economics,

economic decision making

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Contents

Overview

Personality matters. Every day we observe that different people show different ways of behavior although they are exposed to the same situation. While one person buys a subway ticket, the person sitting next to him dodges paying the fare. In another scenario, one person decides to invest his savings in government bonds, while another one prefers to buy options at the stock market. Psychologists attribute a substantial amount of the variety found in people's behavior to personality, more precisely to differences in personality traits. A personality trait refers to "differences among individuals in a typical tendency to behave, think, or feel in some conceptually related ways, across a variety of relevant situations and across some fairly long period of time" (Ashton, 2007).

However, anecdotal and scientific evidence shows that there is also quite a large amount of within-person variance and that even in two apparently similar situations a single person does not always act in an identical way (Mischel, 1968). For example, one day you give money to the beggar in the pedestrian area but the next day you do not. Personality alone seems not to be sufficient to explain human behavior. Other factors such as differences in the specific situational context and the way they are perceived in the respective moment have been found to exert strong effects on behavior and, making things even more complex, significantly interact with personality factors. Several areas of research have shown that the fit, i.e. the compatibility between person and situation variables, determines behavior and the evaluation of outcomes such as satisfaction (Betsch & Kunz, 2008). In the domain of family research, for example, a fit between a person's values and the present environmental opportunities to fulfill these values results in a higher level of satisfaction (Edwards & Rothbard, 1999). Also, motivation and achievement increase if there is a fit between the means available to complete an action and a person's chronic, i.e. habitual, preference (Higgins, 2006). Thus, it is important to pay attention both to person *and* situational variables.

Standard economic theory describes human behavior from the viewpoint of the *homo oeconomicus*. The homo oeconomicus is supposed to be rational and self-interested and to maximize his or her utility according to stable preferences. However, during the last decades an increasing amount of literature has emerged, showing that

the behavior observed in experimental studies deviates substantially from this prediction. In gift-exchange and bargaining games, for example, people engage in other-regarding behavior despite the fact that their partners are anonymous strangers, even if the interaction is singular and does not allow for reputation building (see e.g., Güth, Schmittberger & Schwarze, 1982; Fehr, Kirchsteiger & Riedl, 1993; Forsythe, Horowitz & Savin, 1994; Berg, Dickhaut & McCabe, 1995; Eckel & Grossman, 1996; Charness, 2004).

Findings like these proved the need to revise the model of the homo oeconomicus. For example, behavioral economists started to relax the assumption of pure self-interest and successfully incorporated psychological aspects such as differences in social motives, so called social preferences, into the analysis of behavior. Social preferences are typically modeled as fairness and other-regarding concerns by two influential yet distinct approaches. The approach of *inequity aversion* supposes that people prefer equitable outcomes and that any deviation from the equitable outcome, either advantageous or disadvantageous, reduces a person's utility (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000). The other approach focuses on *reciprocity* as a key determinant for behavior. Here, it is assumed that people respond to kindness and unkindness that they perceive in terms of distributional fairness or intentional fairness (Rabin, 1993; Falk & Fischbacher, 2006). More precisely, people want to reciprocate kind actions by their partners in a kind manner and unkind actions in an unkind manner (for an overview see Fehr & Schmidt, 2006).

A somewhat older but still frequently used way to include the partner's outcome of an interaction into the determination of one's own utility is done by the analysis of social value orientations (Griesinger & Livingston, 1973). Social value orientations are typically assessed with the Ring Measure of Social Value Orientations (Liebrand, 1984). Differences in social value orientations, i.e. in the relative importance assigned to the partner's outcome, can explain quite a large amount of variance observed in people's behavior, e.g. in social dilemma situations (e.g., Offerman, Sonnemans & Schram, 1996; Roch & Samuelson, 1997; De Dreu, Weingart & Kwon, 2000).

Despite economists' vital interest in the role of differences in social preferences, hardly any attention is paid to the question how *individual differences in personality in terms of traits* affect decision making. Although personality research has quite a long history in psychology, researchers of the adjacent discipline of behavioral economics have taken surprisingly little advantage of the profound expertise that has been

accumulated in this area by psychologists. First, this expertise relates to ways of assessment, i.e. to valid and reliable measures that have been developed to detect individual differences in personality. Second, the insight noted above that person-situation variables interact has rarely been taken into consideration in economic research.

This is particularly startling in the light that one of the purposes of economic experimental studies is to investigate how institutions should be designed, e.g., in order to enhance cooperation or organizational commitment among team members. Policies can only be introduced or changed efficiently if it is properly understood how they affect people's motivation to behave in a certain way. For example, the implementation of tournaments in companies might improve the performance of people who like to compete whereas it hampers the performance of the ones who are equally skilled but shyer in nature. For this reason it is crucial to pay attention to the influence of individual personality characteristics if behavior is supposed to be modified. A promising way to meet this challenge is to combine the expertise gained in economics and psychology.

This thesis follows such an interdisciplinary approach and provides a behavioral study of the role of individual differences in personality for economic decision making. Insights from psychological research on personality influences as well as their interaction effects with specific situational variables are applied to decisions made in standard economic games.

In chapter 1, three psychological personality tests are related to decisions in a dictator, an ultimatum and a trust game. The purpose of this study was to explore which traits have an impact on decision making in economic contexts. The advantage of psychological tests is that they reveal the structure of a person's personality on a very comprehensive level. While the tools economists typically use for the assessment of personality variables focus on fairness or distributional questions, psychological tests also consider other aspects, for example predispositions towards dominant or vigilant (distrustful) behavior. Another difference lies in the methodology of psychological and economic ways to assess personality variables[1]. Economic tools, such as the Ring

[1] We will not go into details about the difficulties that arise in interdisciplinary works, e.g. regarding the code of conduct to truthfully inform subjects in economic experiments versus deception in psychological experiments or the question of incentivized payment in economics versus none or absolute

Measure of Social Values (Liebrand, 1984), are *behavioral* tools. The experimenter uses the observation of a person's behavior in one situation (in the Ring Measure 24 decisions about alternative distributions of amounts of money) to predict and explain that person's behavior in a similar situation (e.g. contribution behavior in social dilemma situations or amounts sent in dictator games). Psychological tests are typically *self-report questionnaires* or *projective* measures. In self-report questionnaires, people give answers to questions on a bipolar scale. Projective measures ask for peoples associations to pictures or paintings and thus offer more room for interpretation. We expected that economic behavior can be explained and predicted by tests that operate on a non-behavioral domain and applied two self-report questionnaires (the 16-Personality-Factor-Test; Schneewind, Schröder & Cattell, 1994 and the Interaction-Anxiety-Test; Becker, 1997) and a projective test (the Multi-Motive-Grid; Schmalt, Sokolowski & Langens, 2000). Trait descriptions served as the basis for predictions how the traits would affect decision making.

The data provides support for the usefulness of psychological tests to analyze economic decision making. Decisions in the three games were, for example, influenced by differences on the traits apprehension, fear of self-assertion and dominance. However, the way in which traits affect decisions and also within-person behavior across the games is rather heterogeneous. Inter alia, we find that in line with our expectation very dominant people claim *higher* values for themselves being responders in the ultimatum game than less dominant people. At the same time, though, very dominant people make *higher* offers being proposers in the ultimatum game than less dominant people, which contradicts our expectation. As being the responder in the ultimatum game is a different situation than being the proposer, we conclude that to better understand how differences in traits influence decision making, the experimental setup has to be designed extremely carefully and that attention has to be paid to the different situational contexts in which the decisions are made.

Chapter 2 incorporates the insights from chapter 1 and analyzes interaction effects between traits and situational characteristics in a standard trust game. Typically, economic studies focus on either situational *or* person variables but do not acknowledge the interdependence between these factors. The aforementioned psychological results

payment in psychology. For a discussion of these issues, see Hertwig & Ortman (2001) and van Winden (2006).

on effects of person-situation- fit and our heterogeneous results from study 1 that only focused on personality variables indicate that interaction effects are not negligible. We apply a standard psychological priming procedure in order to induce different situational perceptions in a controlled way. Subjects' focus of attention is shifted either to a prevention focus or to a promotion focus.

We show that a model which accounts for interaction effects can explain a greater amount of the variance found in peoples' decisions than a simple model that only contains main effects of person and situation variables. Depending on the primed situational context, senders' decisions are affected by the personality variables *vigilance*, *altruism* and *competition* to different degrees. Interestingly, the directions of the interaction effects are different for personality variables that are related to social motives such as altruism and competition in comparison to personality variables that are not exclusively confined to social interactions but are behaviorally relevant in a more general sense, such as vigilance. The influence of altruism and competition *increases* when personality and situational variables are in conflict, whereas the influence of vigilance *decreases*.

People do not only differ with regard to personality traits but also with regard to their preferred decision making styles. Decisions can be made rather intuitively or deliberately. Intuitive decisions require little cognitive effort and are made rapidly and automatically (Evans, 2003). Deliberate decisions are more consciously monitored and effortful (Kahneman, 2003). Psychological studies show that the application of an intuitive decision style can lead to different choices than the application of a deliberate decision style (Betsch, C., Betsch, T. & Haberstroh, 2004).

As mentioned before, the Ring Measure of Social Value Orientations (Liebrand, 1984) is a behavioral tool that consists of 24 decisions about distributions of money and is frequently used in economic studies. Differences in decision styles are hardly ever considered by economists. Nevertheless, since decisions are the core element of the Ring Measure, we expect that its results might be affected by the way that the decisions are made. This question is subject of chapter 3. Although people differ in their habitual preferred decision style (Betsch, 2004), the application of an intuitive or a deliberate decision style can also be manipulated (Wilson & Schooler, 1991; Betsch, C., Betsch, T. &

Haberstroh, 2004). Subjects were instructed to make decisions in the Ring Measure either intuitively or deliberately.

We find that the consistency of the decisions and the temporal stability of the social value orientations depend on the decision style. If choices are made deliberately the resulting social value orientations are less stable over time than if choices are made intuitively. The consistency of the repeated choices is higher if a deliberate decision style is applied as compared to an intuitive one. To our surprise, these findings only hold for female subjects. Our results show that it is important to pay attention to psychological aspects such as the applied decision style which may result from the way in which the Ring Measure is instructed.

Chapter 4 approaches the question how to address people's motivation not from the psychological but from the situational, i.e. the institutional, perspective. We investigate how people's willingness to cooperate in a social dilemma situation can be increased by different institutional designs. More precisely, we analyze which feedback mechanism is most efficient in order to increase cooperation. Social dilemma situations are characterized by a conflict between the pursuit of collective and individual interest. Players either choose to cooperate and contribute part of their endowment to a joint project or to keep it for their private account. Contributions to the project are multiplied and equally distributed among all members of the group. Thus, collective benefit is maximized if all members contribute. However, individual benefit is maximized by defecting. If all members pursue their individual interest and free-ride, the group is worse off than if members had cooperated.

Typically, people are conditionally cooperative, i.e. contribution decisions are based on the belief about other group members' contributions (Fischbacher, Gächter & Fehr, 2001). Proceeding from this finding we analyze if an exaggerated feedback about group members' contributions leads to higher beliefs and more cooperation, given that the announced feedback is imperfect in the sense that it might not represent actual contributions.

The results show that a feedback which simply exaggerates the average of partners' contributions cannot prevent the decline in cooperation usually found in public-good games. Apparently, the exaggeration does not compensate for the uncertainty caused by the information that the feedback might deviate from actual contributions. If, by

contrast, every member of the group is given the feeling that the other group members contributed at least the same amount as he or she, i.e. if the exaggeration is conducted based on each subject's own contribution, stable cooperation can be established. Departing from this, the next step should again be to incorporate the psychological perspective and to test whether our finding holds true for all people or only for the ones with specific characteristics.

This thesis shows that personality differences matter for economic action and that an interdisciplinary collaboration between psychology and economics is a promising way to gain a deeper understanding of the underlying forces. Chapter 1 demonstrates how personality characteristics that have an impact on economic decision making can be revealed with standard psychological personality tests. If personality influences are assessed with behavioral tools like the Ring Measure of Social Values, as frequently done in economic studies, one should be aware the results might be prone to influences that result from the application of different decision styles during its completion (Chapter 3). Further, the influence of a person's character on behavior is not trivial since personality variables interact with the specific situational context, as proven by Chapter 2. Thus, in order to efficiently set up institutional frameworks, it is not sufficient to introduce incentive or sanctioning standards. Of course, such policies as feedback mechanisms are essential and their effect depends to a large degree on a careful implementation, as Chapter 4 shows. However, it is also important to pay attention to the fact that these policies might affect people differently, depending on individual personality characteristics.

1 Exploring the Role of Personality Traits on Decisions in Economic Games[2]

1.1 Introduction

Experimental research has demonstrated that observed behavior often deviates from what is predicted by standard economic models. Many times, the classical assumption of a strictly utility-maximizing, rational and self-interested homo oeconomicus is violated (for an overview see Camerer, 2003 and Fehr and Schmidt, 2006). In dictator games, e.g., people give away substantial amounts of money to their partners, even if interactions are anonymous and not repeated.

Findings like these uncovered the need to revise the model of the homo oeconomicus. Behavioral economists relax the assumptions of the standard model by allowing for bounded rationality and by incorporating psychological aspects such as social preferences or other-regarding concerns into the analysis. Models on *inequity aversion* (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000), for example, take into account that people prefer equality in outcomes and that a person's utility of an outcome is reduced if the own payoff is either advantageous or disadvantageous as compared to the outcome of the partner. In *reciprocity based* models, the focus is on a player's response to perceived distributional or intentional fairness behind an interaction rather than on the outcome itself (Rabin, 1993; Falk and Fischbacher, 2006). Kind intentions are rewarded with cooperative behavior, whereas unkind intentions are sanctioned with defection.

An alternative approach that is frequently used to include other-regarding concerns into economic analysis is the concept of *social value orientations* (henceforth SVOs, see for example Van Lange, 1999; 2000). SVOs are individual differences in personality that display the preference for self- versus other-regarding outcomes and can be affected by learning and interaction experiences (Van Lange et al., 1997). The classification of SVOs into *pro-social people* who are willing to cooperate and to maximize outcomes for

2 Based on: "Exploring the Role of Personality Traits on Decisions in Economic Games" by Mareike K. Hoffmann (2010), Working Paper, University of Erfurt.

themselves and for others vs. *pro-self people* who are self-concerned and seek to maximize only their own payoff has repeatedly been used to explain behavior in economic games and social dilemma tasks (e.g. Budescu and Au, 1997; Smeesters et al., 2003).

Despite the success of SVOs and intention or reciprocity based models to explain and predict behavior in economic decision making, there are some drawbacks. First, SVOs and also parameters of inequity aversion are assessed with *behavioral* means, i.e. people's behavior is observed and used as a predictor for behavior in subsequent occasions. SVOs, for example, are derived with the Ring Measure of Social Values (Liebrand, 1984). In the Ring Measure people chose how to distribute amounts of money between themselves and a partner. The disadvantage of this procedure is that it is extremely similar to the behavior in the economic games which it is supposed to explain afterwards because there the task usually also is to decide what to do with certain amounts of money. Second, the analysis of individual differences conducted in behavioral economics until now is incomplete if compared with what experts of the field, psychologists, mean when they talk about individual differences.

According to psychologists, people's behavior is driven by *differences in personality*. These differences, referred to as *traits* that are relatively stable over time and across situations (Guilford, 1973), are not only confined to social preferences with regard to monetary distributions. Instead, they paint a more complete picture and include dimensions such as fear, vigilance and dominance. In contrast to SVOs and social preferences, which are measured with behavioral techniques, traits are typically assessed with *self-report questionnaires* or *projective measures*. Self-report questionnaires are developed along internationally accepted guidelines which guarantee statistical validity and reliability (American Psychological Association, 1999). Answers to the questions are standardized and have to be given on fixed bipolar scales. This technique leads to a high level of comparability and allows for a domain-unspecific assessment of personality. Projective tools do not restrict people's answers to bipolar scales but leave more room for free associations and imagination.

This study combines experts' insights from economic and psychological research in order to explore which individual differences in personality explain behavior in standard economic games. We depart from economists' routine of using behavioral measures and apply the standard psychological methodology of self-reports and

projective tools because we expect that personality differences which are relevant for economic decision making can also be detected with domain-unspecific tests.

The reminder of the study is organized as follows. First, we will introduce how economists and psychologists typically analyze influences of personality on behavior. Since we conducted three economic games and three psychological test, the design of our study is quite complex. Therefore, we provide a compact overview over the economic games that we played and the psychological tests that we applied in section II. A more detailed description of the specific scales in the tests including their proximity to SVOs or other reasons for their selection as well as expectations about the relationship between traits and behavior in the games will be outlined in section III. Section IV explains the experimental setup of our study. Results are reported and discussed in section V. The conclusion is derived in section VI.

1.1.1 Personality Assessment in Economics

Economists typically assess personality related variables with behavioral measures[3]. We restrict ourselves to report on the tool that is most frequently used in economic literature, the Ring Measure of Social Values (Liebrand, 1984). In the Ring Measure, people make 24 decisions about the distribution of amounts of money between themselves and an anonymous partner. Subjects' SVOs and also the consistency of the SVO can be calculated very precisely according to the 24 decisions. This leads to a classification into *pro-social* and *pro-self* oriented people. While pro-socials assign greater importance to maximizing joint outcomes and are interested in building and maintaining relationships, pro-selfs do not care for the well-being of their partners and only cooperate if it serves their own self-interest (Giebels et al., 2003; Van Dijk et al., 2004; Stouten et al., 2005). Further, it has been found by Handgraaf et al. (2003) and Van Dijk et al. (2004) that pro-socials frequently offer more to their partners than pro-selfs in ultimatum games and, unlike pro-selfs, do not reduce their offers if the

3 There are hardly any studies that report the use of psychological tests for the analysis of economic decision making like we do in this study. One study that comes close to it because it also applies a personality test in order to explain decisions in an economic game has been conducted by Brandstätter and Königstein (2001). Brandstätter and Königstein (2001) find that proposers in an ultimatum game who are very independent and tough-minded demand higher shares for themselves than people who score lower on these dimensions and that responders reject offers more often if they are more emotionally unstable and extraverted or if they are more emotionally stable and introverted than others. However, the authors only use an "economic" short version of the original test (the 16PA; Brandstätter, 1988) and limit their analysis to general, so called global, factors that describe personality on a very broad level. In contrast to that, we want to explore the influence of more specific, so called primary, traits on economic decision making.

information of the responder about the size of the pie is reduced. This shows that pro-socials do not take advantage of their partners even if they could because they are better informed.

Pro-socials can be further subdivided into *altruists* and *cooperatives*. Altruists are different from cooperators because they are more extreme and would even take action if it only served the partner's wellbeing and not their own. Cooperators cooperate as long as their behavior is reciprocated but stop if the partner defects (Kurzban & Houser, 2001). Pro-selfs can be further subdivided into *individualistic* and *competitive* people. Individualists are only concerned with maximizing their own payoff and would either help or harm others (Van Lange et al., 1997). Competitives are also concerned with maximizing their own profits but want to be relatively better off than their partners. In order to achieve that aim, they are even willing to engage in behavior that is not only destructive for their partner but also for themselves (Deutsch, 1985). In other words they even incur costs and sacrifice efficiency if this makes them relatively better off than their partner. Research in common-pool-resource dilemmas has shown that competitors usually request the most, followed by individualists and cooperators, while altruists take the least (Budescu et al., 1997; Kramer et al., 1986, Liebrand & van Run, 1985).

In the next section we will introduce the economic games that we applied in our study, along with the self-report and projective measures.

1.1.2 Personality Assessment in Psychology

In psychology there is a long tradition of personality research. Most psychologists nowadays agree upon the Big Five as a framework to describe a person's personality on the broadest level (for a review see John and Srivastava, 1999). Assuming that most socially relevant individual differences are codified in the language, the Big Five evolved from a lexicographic approach. Allport and Odbert (1936) extracted about 18.000 words that referred to a person's personality from the Webster's New International Dictionary and allocated them to four clusters. Building on their work, Cattell (1946) conducted factor analyses and located 16 primary source traits that represent the underlying structure of personality. Factor analyzing the primary traits led to the emergence of five global factors. Based on Cattell's scales, a variety of different tools has been developed and statistically approved in order to assess the dimensions of the Big Five and the respective traits, e.g. the NEO Personality Inventory, Revised (Costa and McCrae, 1992), the Big Five Inventory (see Benet-Martínez and John, 1998; John and Srivastava, 1999)

and the 16 Personality-Factor Test (Schneewind et al., 1994). The recent Big Five taxonomy consists of the factors *Openness, Consciousness, Extraversion, Agreeableness* and *Neuroticism.* Each factor subsumes of a number of different primary traits which are typically assessed with self-report questionnaires. In these self-reports people answer questions on a bipolar scale ranging from "I absolutely agree" to "I do not agree at all". The answers to the questions are subsumed to scales which reflect individual differences on the specific traits.

The framework of the Big Five assesses personality on a rather broad level because it reflects a person's general attitudes and thoughts across a variety of situations. There exist, however, other tests, which have a narrower focus on specific aspects of personality, e.g., social motives. As the name suggests, social motives are relevant in contexts of social interaction and are defined as evaluative dispositions that serve as the basis for taking action and are relatively stable over time (Heckhausen, 1991). Thus, the concept of social motives in psychology is very similar to the concepts of social preferences and SVOs in economics because both are concerned with the relative importance given to another person compared to the self, e.g. with regard to monetary distributions or other factors such as the desire to exert power.

As pointed out in the beginning, traits and social motives are not always assessed with self-reports but also with projective measures. Projective measures have a large freedom of response. Typically, people are given sheets of paper and asked to write or draw something or they are asked to interpret pictures. Answers are not right or wrong because all responses are considered to be reflections of a person's personality (Rorschach, 1924; Murray, 1943).

1.2 Materials

1.2.1 Economic Games

We decided to choose the dictator, the ultimatum and the trust game for our study because these are the most basic games in experimental economics. Since our work is exploratory to a great extend, we wanted to keep the analysis as simple as possible and tried to avoid complex interaction patterns between players. Subjects' decisions in the three games served as the *dependent* variables in our analyses.

The dictator game. In the dictator game, there are two players. One player, the dictator, receives an endowment of 10 points from the experimenter. The dictator

decides how many points to keep for himself and how many points to send to the other player. The second player has no recourse and can only take the offer.

The ultimatum game. In the Ultimatum Game, there are two players, one being the proposer and the other the responder. The proposer receives an endowment of 10 points from the experimenter. The proposer's task is to make an offer how to split the points between himself and the responder. The responder decides whether to accept or reject the offer. In case of acceptance, the money is divided according to the proposal. In case of rejection in the standard version, which we used in this study, both players end up with 0 points.

The trust game. The trust game also consists of two players, one being the trustor and the other one the trustee. Both players receive an endowment of 10 points from the experimenter. The trustee pockets his/her endowment. The trustor may send any fraction of his/her endowment to the trustee. The amount sent is doubled by the experimenter before it is received by the trustee. The trustee may return to the trustor any fraction of the amount that he/she received from him/her. The amount sent back is not doubled before being given to the trustor.

1.2.2 Personality Tests

We use subjects' scores on the different scales on the personality tests as the *independent* variables. As pointed out before, our aim is to apply standard psychological methodologies for personality assessment to understand decision making in economic games and to explore personality influences that are yet unknown in this context. The selection of the tests was first and foremost guided by psychologists' descriptions of trait-typical behavior. The number of existing personality tests is vast. In order to gain an idea which tests are most appropriate for our purpose, we searched for tests that contain traits which are by definition similar to the SVOs that economists assess. Thus, the similarity to SVOs served as a mere orientation and we did not directly assess SVOs with the Ring Measure. The question how well SVOs and traits *correlate* is without any doubt interesting but distinctive from the present research question.

The Interaction-Anxiety Questionnaire. The Interaction-Anxiety Questionnaire (henceforth IAF; Becker, 1997) is a psychological test that is designed to assess a persons' individual disposition to be afraid in social interactions. According to psychological research, there exist large differences between people in the extent to which they feel scared by different situations. The IAF assesses individual differences in

anxiety by the three domains physical damage, proving oneself and disapproval by others. People who show high levels of fear in a certain domain usually perceive more intense feelings of fear in situations that are linked to that domain (Endler, 1975). The IAF consists of 55 questions which make up six scales, two belonging to each domain: *fear of physical injuries* and *fear of diseases/doctoral treatment* (physical damage), *fear of performance* and *fear of violating norms* (proving oneself), *fear of self-assertion* and *fear of depreciation* (disapproval by others).

This test was chosen for this study because social interaction is present in all the games we played. The scale fear of norm-violation is of special interest because there is evidence that social norms play an important role in economic decision making (Pillutla and Chen, 1999; Fehr and Fischbacher; 2004). Another reason was the scale fear of self-assertion, which can be seen as the opposite pole of what is called individualistic behavior in terms of SVOs. The reminder of the scales was interesting from an explorative point of view.

The Multi-Motive Grid. The Multi-Motive Grid (henceforth MMG; Schmalt et al., 2000) is a semi-projective tool to assess people's motivational tendencies with regard to the social motives need for achievement, affiliation and power. It is projective because it consists of 12 ambiguous pictures. However, instead of requiring the writing of stories, a set of statements is appended to each picture. Participants tell whether they agree or not with any statement (see appendix for an example). The number of agreements and disagreements are converted into scores for scales. There are two scales for each motive: *hope for success, fear of failure* (achievement)*, hope for affiliation, fear of rejection* (affiliation)*, hope for control and fear of loss of control* (power).

The reason to choose this test was that a low score on the scale hope for affiliation might be similar to an individualistic SVO and that a high score on the scale hope for success might be related to a cooperative SVO in the context of our games. Again we analyzed the other scales from an explorative perspective.

The 16-Personality-Factor-Test. The 16 Personality-Factor Test (henceforth 16PF; Schneewind et al., 1994) is a multidimensional measure of normal-ranged personality. The 16PF is one of the tests to assess personality within the framework of the Big Five. The test identifies the five second-order global factors *extraversion, independence, self-control, anxiety* and *tough-mindedness* that describe personality at a broader, conceptual level and 16 more precise traits that reveal fine details between

persons and are more powerful in predicting actual behavior. The 16 primary factors are captured by 192 questions and measure the following traits: *warmth, reasoning, emotional stability, dominance, liveliness, rule-consciousness, social boldness, sensitivity, vigilance, abstractedness, privateness, apprehension, openness to change, self-reliance, perfectionism* and *tension*.

This test was chosen because it is one of the most frequently used tools to assess personality variables. Further, the scale warmth is close to the concept of an altruistic SVO and the scale dominance might be related to a competitive SVO. On top of that, the scale rule-consciousness again is related to the role of social norms. The scales vigilance and apprehension were analyzed for explorative reasons. The description of typical behavior of vigilant and apprehensive people suggests that these traits might influence behavior in economic games, too. For completeness' sake, the whole 16PF was conducted instead of only focusing on the scales of immediate interest.

1.3 Expectations

The following section provides a detailed description of the traits of concern, including an explanation of their relatedness to SVOs and how they possibly influence decisions in the three games. The selection of traits was not theoretically guided but followed psychologists' descriptions about trait-typical behaviors and findings that economists reported about the influence of personality on behavior in economic games. Therefore, instead of outlining specific hypotheses, we prefer to restrict ourselves to report expectations. Each trait is given a number in parenthesis and the order is organized by psychological tests. An overview about the expected relationship between traits and decisions in the three games is provided in Table 1.1.

Table 1.1: Expected relationships between decisions in games and personality traits[4].

	Interaction-Anxiety-Questionnaire		Multi-Motive-Grid				16-Personality-Factor Test				
	Fear of norm-violation (1)	Fear of self-assertion (2)	Hope for affiliation (3)	Fear of rejection (4)	Hope for success (5)	Fear of failure (6)	Social warmth (7)	Rule-consciousness (8)	Dominance (9)	Vigilance (10)	Apprehension (11)
DG Offer	+	+	+	+			+	+	-		+
UG Offer	+	+	+	+	+	+	+	+	-	-	+
TG Offer	+	+	+	+/-	+	+/-	+	+	-	-	+
MAV	-	-	-	-	-	-	-	+	+	+	-
TG Back	+	+	+	+			+	+	-		+

Traits explored by the Interaction-Anxiety-Questionnaire

Research in experimental economics has provided evidence for the importance of social norms for cooperation. Pillutla and Chen (1999) have shown that subjects contribute more to a public good game if the context connotes that the norm is to cooperate rather than to defect. Fehr and Fischbacher (2004) suggest that cooperation is based on the compliance with a social norm of cooperation. The norm is to cooperate as long as others cooperate but it is accepted to defect if others defect. According to Fehr and Fischbacher (2004), cooperation ends as soon as the norm is violated because one person defected although he or she was expected to cooperate. In order to see whether

4 Positive prefixes signify that higher values on traits are associated with higher amounts of points given in the games. Negative prefixes signify that higher values on traits are associated with lower amounts of points given in the games.

the relevance of social norms for economic decision making can also be detected using standardized psychological tools, the scale **fear of norm violation** (see no. 1 in Table 1.1) was included into the analysis. Higher scores on that scale signal a stronger aversion to the violation of norms (Becker, 1997). Given that the social norm is to strive for equity in the dictator and the ultimatum game and to cooperate in the trust game, there should be a positive correlation between the score on norm violation and the amount of offers in the three games as well as the amount returned in the trust game. Further, since high scores on fear of norm violation display a willingness to give in to other people's demands for the sake of harmony (Becker, 1997), there should be a negative correlation with the amounts that people claim for themselves in the ultimatum game, i.e. with the MAV.

The scale **fear of self-assertion** (see no. 2 in Table 1.1) was included into the analysis because low values on that scale are similar to what is called individualistic behavior in terms of SVOs. Individualists do not care for the consequences of their behavior for other people. Fear of self-assertion measures the extent to which people are *afraid* to pursue their own will, especially if it is not approved by others (Becker, 1997). Therefore, people with low scores are not afraid to pursue their own will, in other words to act individualistically. This topic is very present in the dictator, the ultimatum and the trust game. In all three games the receiving player will not like, in other words not approve, if no points are sent or offered, respectively. Therefore, we expect that scores on fear of self-assertion are positively correlated with all offers and back transfers in the trust game. With regard to the behavior of responders in the ultimatum game, a stronger fear of self-assertion should lead to lower MAVs because low MAVs are less likely to be disapproved by others than high MAVs. Thus, the correlation between scores on fear of self- assertion and minimally accepted values (MAV) is probably negative.

Traits explored by the Multi-Motive-Grid

The scale **hope for affiliation** (see no. 3 in Table 1.1) measures the extent to which people want to be liked by others and care about other people's opinion (Schmalt et al., 2000). It was included because low scores on that scale are also similar to individualism in terms of SVOs. Scores on this scale should be positively correlated with offers in the dictator, in the ultimatum and the trust game and amounts sent back in the trust game as well as negatively with the minimum that responders are willing to accept in the

ultimatum game. High offers probably result in positive feelings from the partner, increasing the chance of being liked. The same holds if trustees reciprocate large amounts in the trust game and responders only claim small amounts for themselves (i.e. only announce small MAVs).

The scale **fear of rejection** (see no. 4 in Table 1.1) is of special interest since it might affect decision behavior in our games in different ways. The fear of rejection measured in the MMG refers to the fear to be rejected within personal interactions, i.e. by other people. The aim of people scoring high on that scale is to avoid things that could be disapproved by others and to avoid being criticized (Schmalt et al., 2000). Therefore, on the one hand, subjects with a strong fear to be rejected should offer their partners more points in the dictator, the ultimatum and the trust game. In the role of the responder in the ultimatum game, they should have lower MAVs and return more in the role of the trustee in the trust game. On the other hand with regard to trustors' behavior, a strong fear to be rejected might also lead to a different action. If trustors' fear to be rejected is too strong, they might assume that their trustee does not return points to them no matter how many points they send. If this was true, subjects with a strong fear to be rejected will offer less because they think they will lose their investment anyway.

The scale **hope for success** (see no. 5 in Table 1.1) measures the desire to achieve given goals and to finish things in the best way possible (Schmalt et al., 2000). In the ultimatum game a success would be to make an offer that is accepted. As higher offers increase the possibility of acceptance, scores on the scale hope for success should be positively related to offers. The same holds for offers in the trust game. In the trust game a success would be to increase earnings by taking advantage of the multiplication of points that are sent. Thus, a stronger hope for success should lead to higher offers. Following the same reasoning, higher scores on hope for success should lead to lower MAVs. The probability of reaching an agreement is higher if the amount that the responder claims is smaller.

The scale **fear of failure** (see no. 6 in Table 1.1) measures the extent to which people are afraid of not behaving correctly and doing something that leads to a somehow undesired outcome (Schmalt et al., 2000). Higher offers in the ultimatum game and in the trust game increase the possibility of acceptance and of possible earnings. Thus higher offers decrease the chance of being blamed by the partner not to have behaved correctly. Therefore, the expected relationship between scores on fear of failure

and offers in the ultimatum and the trust game is positive. Smaller MAVs increase the possibility that an offer is accepted and reduce the danger of being blamed to be too demanding. For this reason, the relationship between this scale and the MAV should be negative. However, there is a possible alternative consequence that high scores on fear of failure might have. If the fear to fail is interpreted in the sense that losing money is a failure, offers in the trust game should be negatively correlated to that scale. A strong fear to fail could result in extremely low offers since this is the only way to prevent a monetary loss.

Traits explored by the 16-Personality-Factor Test

The scale **social warmth** (see no. 7 in Table 1.1) measures how interested people are in others and how much they care for other people's well-being (Schneewind et al., 1994). This scale is similar to the SVO described as altruism and therefore included into the analysis. Social warmth should be positively correlated with offers in the three games and the amount returned in the trust game and negatively with the MAV. The more people are interested in other people's well-being, the more will they offer and return to their partners and the lower will be the amounts that they claim for themselves.

Rule consciousness (see no. 8 in Table 1.1) tells about how much people are aware of social norms and adhere to those norms (Schneewind et al., 1994). Besides fear of violating norms of the Interaction-Anxiety Questionnaire, this is a second way to check the assumption that social norms play a role in economic games. If the norm is to share with others and to reward kind behavior, high scores on rule consciousness should be positively correlated with offers of dictators, proposers and trustors. Further, highly rule conscious subjects could be interested in the maintenance of norms and thus have higher MAVs. They probably also return higher amounts to their partners in the trust game than less rule conscious subjects.

The scale **dominance** (see no. 9 in Table 1.1) measures the desire to pursue one's own will and the willingness to accept other people's opinions and decisions. High scores reflect little tolerance for compromises and a desire to exhibit power over others (Schneewind et al., 1994). Therefore, high scores on dominance are likely to be associated with small offers in the dictator, ultimatum and trust game, high MAVs and small back transfers in the trust game.

Vigilance (see no. 10 in Table 1.1) informs about a person's tendency not to trust in other people. Vigilant people assume that others want to take advantage of them and are very sensitive to actions by others (Schneewind et al., 1994). This means that vigilant proposers in the ultimatum game probably suspect that responders will try to exploit them. In order to prevent that, very vigilant proposers probably make lower offers although they know that then their offer might be rejected. Regarding responders in the ultimatum game, high values on this scale could be associated with high MAVs because responders also want to protect themselves from being exploited by proposers who make low offers. Again they would prefer to accept that no deal will be made in the end to being exploited by the partner. In the trust game high scores on vigilance probably lead to low offers because vigilant people assume that their partner will not send back anything. Summing up, the correlation for vigilance will probably be negative with offers in the ultimatum game and the trust game and positive for vigilance and MAVs in the ultimatum game.

The last scale that we included into the analysis is **apprehension** (see no. 11 in Table 1.1). High scores on apprehension are a sign that people care very much for what other people think about them and that they have a strong desire to behave in a way that is being considered as appropriate by others (Schneewind et al., 1994). Thus, we expect high scores on apprehension to be positively correlated to offers in all three games and to returns in the trust game and negatively correlated to MAVs in the ultimatum game.

1.4 Method

Participants and Design

The study was conducted at the University of Erfurt, Germany, with 80 subjects from different majors (69% women, M_{age}= 23 years, SD= 3.89). Subjects were invited via the electronic recruitment program ORSEE (Greiner, 2004) and randomly assigned to the group that filled in the IAF (n=30), the MMG (n=30) *or* the 16PF (n=20). Due to time and budget constraints it was not possible to collect data on *all three* tests by every single subject. All subjects played the dictator game followed by the ultimatum game (Güth et al., 1982) and finally the trust game (Berg et al., 1994). Decisions in the three games were used as dependent variables. The scales of the personality tests served as the independent variables. All games were programmed in z-Tree (Fischbacher, 2007) and all tests were conducted with pen and paper. Subjects did neither know the games

before nor how many games they would be going to play. Within the games, all subjects acted in every role once, i.e. they were the dictator in the dictator game, sender and responder in the ultimatum game and trustor and trustee in the trust game. Decisions in the role of second movers (responders in the ultimatum game and trustees in the trust game) were elicited with the strategy method. This means that responders announced whether they would accept or reject each possible offer and trustees announced which amount they would return for each possible amount received. The order of the roles, i.e. whether the first decision was made being the first or the second mover, was counterbalanced. In the dictator game, subjects acted only in the role of the dictator. The payment for the experiment consisted of a flat fee of 3€ for filling in the questionnaire and a variable part that was paid according to the decisions made in the games. In order to calculate the payment for all game decisions subjects were randomly paired with one anonymous partner who received the amounts of points they sent in the role of the first mover and from whom they received the amounts of points in the role of the second mover. With regard to the dictator game, half of the subjects were paid in the role of the dictator and the other half in the role of the person who received the transfer. One point in the games equaled 0.20€. The average payoff was 10.53€ and the experiment took on average 70 minutes.

Procedure

At the beginning, subjects were told that they would first make a number of decisions and then be asked to fill in a questionnaire. It was announced that the decisions would be unrelated and that a decision made in one task would not affect the space of action in the next task. Instructions for the dictator, the ultimatum and the trust game were read aloud immediately before playing each game. Subjects were randomly paired with a new anonymous partner in each game and for each decision. After the last decision in the trust game, subjects were asked to fill in the IAF, MMG or 16PF with pen and paper. The instructions for the personality tests were given on the first page of the tests. After filling in the test, subjects were debriefed, thanked and paid.

1.5 Results and Discussion

Before turning to the influence of traits on behavior, we will analyze the consistency of subjects' behavior across the three games and in the two roles, i.e. across the five

decisions. If behavior across games is not even consistent to some degree, the explanation of behavior by traits can hardly be successful.

1.5.1 Analysis of Behavior in Games

Descriptive data for game decisions

Figure 1.1 displays subjects' decisions in the games. The mean amount of points allocated by all dictators is 4.01 and does not differ much across groups (all $p > .10$, Mann-Whitney U-Tests). The strategic component of the ultimatum game leads to significantly higher mean offers than in the dictator game ($M_{UGOffer} = 4.68$; $M_{DGOffer} = 4.01$; $p < .05$, Wilcoxon-Test). Ultimatum offers are quite homogenous across all groups (all $p > .10$, Mann-Whitney U-Tests). The mean amount sent in the trust game is 2.84 and does also only differ slightly across groups (all $p > .10$, Mann-Whitney U-Tests). The mean MAV in the ultimatum game is 3.83. The mean coefficient in the slope of trustees' back transfer decisions in the trust game is 0.73 (0 being free-riders who never send back anything and 2 being pure altruists who send back everything). Thus, on average, trustees behave like conditional cooperators. The amount they return depends on the amount they receive but tends to be slightly less (1 would be the slope of a perfect conditional cooperator), a finding that is perfectly in line with results by Güth et al. (2001) and Fischbacher & Gächter (2010).

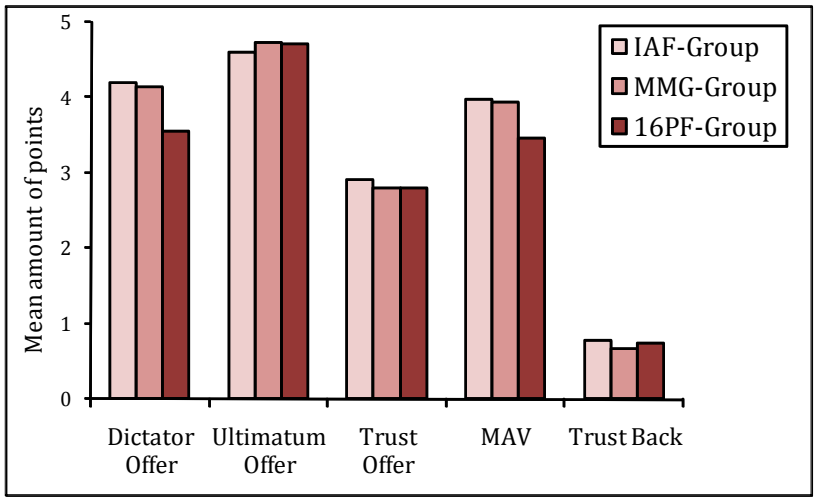


Figure 1.1: Decisions in games by group.

Relationship between games

Now we turn to the question how the decisions in the three games are related to each other. Since all subjects played all games, correlations between games were calculated for all participating subjects jointly (n=80). Table 1.2 displays the results. Offers in the dictator game are significantly and positively correlated with offers in the ultimatum and in the trust game. Thus, despite the different structure of the games, subjects who make high offers in the dictator game are also likely to make high offers in the ultimatum and in the trust game. Moreover, offers in the trust game are highly significantly and positively correlated with back transfers. This means that higher offers by trustors' are associated with higher amounts returned by trustees, which is also a frequently found result (for instance, Gneezy et al., 2000). MAVs are not correlated to any other decision in the games. Thus, what one expects to be a fair offer from the responders' viewpoint does not necessarily correspond to what one offers being the proposer.

Table 1.2: Correlations between game decisions. Levels of significance in parentheses.

	DG Offer	UG Offer	TG Offer	MAV	TG Back
DG Offer	1	.234 (.037)	.234 (.030)	-.018 (.875)	-.003 (.980)
UG Offer		1	.322 (.004)	.079 (.487)	.081 (.513)
TG Offer			1	.018 (.874)	.344 (.006)
MAV				1	.144 (.359)
TG Back					1

Result 1: Offers in the dictator, in the ultimatum and the trust game are positively correlated.

Classification of types by behavior in games

Next, we check whether subjects make similar decisions in the different games, i.e. if they display consistent behavior across games. Since the structure of the three games

differs (for example, the dictator game lacks the strategic component of the ultimatum game), it might be that subjects do not always offer exactly the same amount in all games. However, according to psychologists, on a global level, when several situations are aggregated, people show general patterns of behavior (Ajzen, 1987). Therefore, we expect that in our games subjects will display consistent behavior if we allow individual decisions to vary some interval of points. To capture this range, we categorized behavior according to the scheme presented in Table 1.3. Decisions in favour of the own well-being are classified as self-oriented. Decisions in favour of the partner's well-being are classified as other-oriented. Decisions that allocate about equal amounts of points to the self and to the partner are classified as equity-oriented.

Table 1.3: Categorization of players' types by amounts of points sent[5].

Type	DG Offer	UG Offer	TG Offer	MAV	Trust Back
self-oriented	0-3	0-3	0-3	7-10	< 0.85
equity-oriented	4-6	4-6	4-6	4-6	< 1.00
other-oriented	7-10	7-10	7-10	0-3	> 1.00

As can be seen in Figure 1.2, the majority of dictators and first movers in the ultimatum and the trust game can be categorized as being equity-oriented when they make offers (in all three decisions more than 50%). The second most often found type of behavior is self-orientation. Other-oriented behavior is only apparent in less than 10% of dictators' and first movers' decisions in the ultimatum game and the trust game. The picture looks different with regard to MAVs in the ultimatum game. Here, self-oriented behavior is absolutely absent and equity- and other-oriented behavior is found about equally often. The absence of self-oriented behavior is presumably caused by the strategic component of the ultimatum game because it is very likely that responders punish egoistic behavior of senders by rejecting low offers. The most common type of behavior with regard to

5 The lower boarder of 0.85 for equity-oriented behavior in the trust game was chosen because this value is obtained when about half of the points that can be received are returned. Setting the lower boarder slightly higher or lower was tested but lead to similar results.

back transfers in the trust game is self-orientation in almost 70% of the cases. Equity-oriented behavior is found in 18% and other-oriented behavior in about 14%.

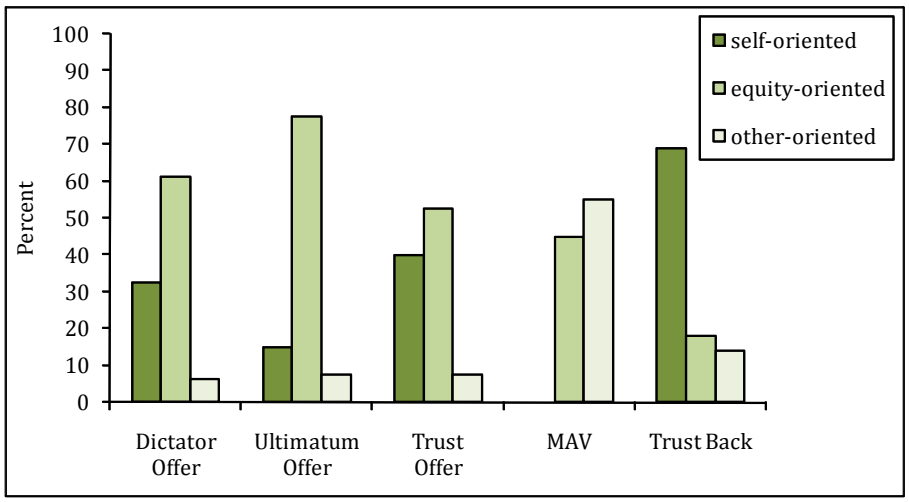


Figure 1.2: Frequency of players' type by game.

Result 2: The majority of offers in the three games can be categorized as equity-oriented, the majority of MAVs as other-oriented and the majority of back transfers as self-oriented.

Consistency of types

Figure 1.3 shows how often subjects can be classified as being the same type over all five game-decisions. 83% of subjects belong to the same category in *three or more* of the decisions. This shows that a substantial amount of participants behaves quite consistently across the different games and roles, in other words makes decisions that treat the partner similarly. Of those who are three times in the same category 58% belong to the equity-oriented type (see Table 1.4), followed by 33% who are self-oriented and only 9% who are other-oriented. Further, the largest proportion of this group made the (categorically) same decisions in the role of the dictator in the dictator game, the sender in the ultimatum game and the trustor in the trust game (about 25%).

34% of all subjects can be categorized as the same type in exactly four out of the five decisions. Of those, the majority belongs to the equity-oriented type (74%). 22% belong

to the other-oriented type and only 4% to the self-oriented type. In 64%, the four decisions that result in being in the same category were offers made in the dictator, the ultimatum and the trust game and responders' MAVs in the ultimatum game. In 26%, subjects belong to the same category for four times due to their offers in the dictator, the ultimatum and the trust game and trustees' back transfers in the trust game.

Only three subjects can be categorized as self-oriented, equity-oriented or other-oriented in all five games decisions. This finding might first and foremost be driven by the fact that there are few subjects who behaved self-oriented in the role of the responder in the ultimatum game, whereas self-orientation is frequently displayed in the other games.

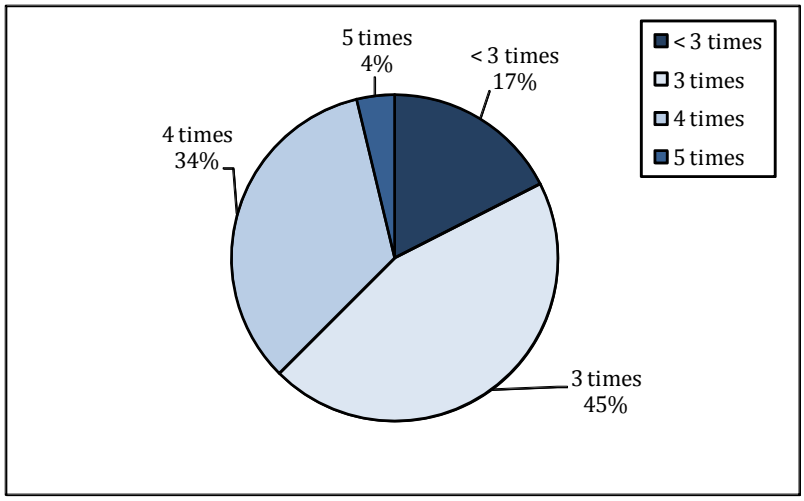


Figure 1.3: Consistency of players' decisions: number of times being categorized as the same type in game decisions.

Table 1.4: Players' types, sorted by how often and in what games the same category was obtained.

No. of same type	at least 3 times	exactly 4 times	exactly 5 times
self-oriented	9%	4%	
equity-oriented	58%	74%	100%
other-oriented	33%	22%	
same decisions made in	DG Offer, UG Offer, TG Offer (25%)	DG Offer, UG Offer, TG Offer, MAV (64%)	all games
	DG Offer, TG Offer, TG Back (22%)	DG Offer, UG Offer, TG Offer, TG Back (26%)	

Result 3: On an aggregated level, subjects' decision behavior across games is relatively consistent.

As subjects' decisions across games are quite consistent at least at this level of aggregation, the prerequisites to detect personality influences that affect behavior in games are given. Nevertheless, there is a non negligible amount of subjects who make rather heterogeneous decisions. This finding in line with results by Brosig et al. (2007) who report that behavioral consistency across different games is rather low.

Unfortunately, it is not possible to test whether subjects who are self-oriented score differently on personality scales than subjects who are other-oriented (or equity-oriented) because the number of subjects who fall into the same type-category *and* who completed the same personality questionnaire is too small. Thus, the categorization by game-decisions depicted behavioural differences between games but consists of a categorization that is too broad to reveal differences on specific traits. In the next section we take a different view. We test whether subjects who score high on a specific trait make decisions in the games that are different from decisions made by subjects who score low on that trait.

1.5.2 Analysis of Influences of Traits

Regarding the influences of traits, we will first discuss the results that are in line with our expectations. The results that conflict our expectations will be discussed afterwards in section V.3. The results that are discussed in the current section are reported in the tables in bold print.

Correlative Analysis

Correlations between individual traits and decisions in games are reported in Table 1.5. More precisely, correlation coefficients show the relationship between scores on a particular trait and the number of points offered in the dictator, the ultimatum and the trust game. A positive (negative) relationship means that high scores on a trait are linked to high (low) amounts of points sent by dictators, proposers and trustors. Regarding responders in the ultimatum game, coefficients display the relationship between scores on traits and the smallest offer that would be accepted (MAV). Positive (negative) correlation coefficients show that high scores on a trait are associated with high (low) MAVs, i.e. that person only accepts offers that are not too small (also accepts small offers). With regard to trustees in the trust game, correlation coefficients show the

relationship between scores on a trait and the coefficient of the slope of amounts returned relative to amounts that were received. A positive (negative) correlation coefficient signals that high values on a trait are linked to high (low) amounts returned.

Table 1.5: Correlations between scores on trait scales and amounts sent in games.

	Interaction-Anxiety-Questionnaire		Multi-Motive-Grid				16-Personality-Factor Test				
	Fear of norm-violation (1)	Fear of self-assertion (2)	Hope for affiliation (3)	Fear of rejection (4)	Hope for success (5)	Fear of failure (6)	Social warmth (7)	Rule-consciousness (8)	Dominance (9)	Vigilance (10)	Apprehension (11)
DG Offer	.284	**.355**	-.192	-.227			-.231	.173	.379		**.433**
	(.128)	**(.055)**	(.319)	(.236)			(.327)	(.467)	(.083)		**(.057)**
UG Offer	.250	.130	.073	-.175	.031	.260	.338	-.099	.316	.380	-.099
	(.183)	(.492)	(.707)	(.363)	(.870)	(.166)	(.146)	(.679)	(.175)	(.099)	(.678)
TG Offer	**.346**	.170	.156	.406	**.458**	.145	.036	.269	.345	.137	**.455**
	(.061)	(.369)	(.420)	(.029)	**(.011)**	(.446)	(.880)	(.252)	(.136)	(.564)	**(.044)**
MAV	.221	.331	-.199	-.197	-.034	.040	.207	-.205	.204	.041	**-.416**
	(.241)	(.074)	(.301)	(.307)	(.860)	(.834)	(.381)	(.386)	(.389)	(.863)	**(.068)**
TG Back	-.297	-.399	-.063	.212			.317	-.243	.647		.033
	(.141)	(.044)	(.758)	(.298)			(.250)	(.384)	(.009)		(.907)

Dictators' offers are positively correlated with values on the scale fear of self-assertion and with values on the scale apprehension. This is in line with what we expected because subjects who score high on self-assertion have a hard time to stand up for themselves and to pursue their own will. Thus, they probably do not dare to keep much for themselves and therefore offer higher amounts when they are making decisions as dictators. High scores on apprehension reflect the tendency to be worried to

have done anything wrong and to be disapproved by others. Since disapproval by the person who receives the points can be reduced by higher offers, the finding that dictators' offers are positively correlated with scores on the scale apprehension is in line with what was assumed. The fact that subjects interact anonymously and that there is no possibility for direct disapproval does not speak against this finding as "people have unconscious, pre-programmed rules of social exchange behavior that suit them well in the repeated game of life's interaction with other people" and these patterns are "imported into the laboratory" (Hoffman et al., 1996).

Offers in the trust game are positively linked to values on the scale fear of norm-violation. Assuming that the social norm is to offer points in order to take advantage of the possibility to increase the payoff by cooperating, this finding is in line with what was expected. Further, trustors' offers are highly significantly correlated to values on the scale hope for success. As the increase in payoffs can only be successfully achieved if the proposer offers points, it is no surprise that people who aim very much at successfully solving tasks also offer more points. Moreover, there is a positive relationship between apprehension and offers in the trust game. As the level of apprehension rises, also the amount offered rises. Following the same reasoning about apprehension just outlined with regard to dictators' offers, this finding is in line with what we expected.

With regard to **responders' decisions in the ultimatum game**, there is a negative relationship between MAVs and scores on the scale apprehension. This signals that more apprehensive subjects have lower MAVs. Lower MAVs increase the possibility that a deal is actually made and are therefore offered by subjects who are more concerned to do everything right.

Offers in the ultimatum game are not significantly correlated to any traits. This could be due to the strategic aspect of the game. The structure of this game gives a clear hint on the possibility that too small offers might be rejected. Thus, the decision is made in what is called a "strong" situation, i.e. a situation that itself provides strong cues on what behavior would be appropriate. According to Snyder and Ickes (1985), the influence of personality on behavior is stronger in weak situations that lack hints on appropriate behavior.

Surprisingly, with regard to **trustees' decisions** in the trust game, we did not find correlations in the expected direction.

High scorers versus low scorers

Next, we check whether people who score high on a trait behave differently in the games from people who score low on that trait. We split subjects' scores on traits by the median and test if persons with scores on the upper half of a trait give significantly more or less points to their partners than subjects lying in the lower half. The dependent variable is the decision in the game, differences are checked for with Mann-Whitney-U Tests (one-sided) and levels of significance are given in brackets. Table 1.6 displays the results and keeps the prefixes from Table 1.1 in order to show what kind of effect we expected. The positive prefix in the cell of fear of self-assertion and offers in the dictator game, for example, suggests that subjects with higher scores on fear of self-assertion offer more points in the dictator game. Thus, we do not only expect a difference between offers by low- versus high-scoring subjects but also assume who will give more.

Table 1.6: Tests of subjects with high scores vs. subjects with low scores on personality scales.

	Interaction-Anxiety-Questionnaire	Multi-Motive-Grid				16-Personality-Factor Test						
	Fear of norm-violation (1)	Fear of self-assertion (2)	Hope for affiliation (3)	Fear of rejection (4)	Hope for success (5)	Fear of failure (6)	Social warmth (7)	Rule-consciousness (8)	Dominance (9)	Vigilance (10)	Apprehension (11)
DG Offer		**+ .064**	+ .042	+ .039					- .085		
UG Offer				+ .095					- .078	- .070	
TG Offer	**+ .047**			**+/- .070**	**+ .019**						**+ .018**
MAV		- .047							**+ .095**		**- .083**
TG Back	+ .078	+ .057						+ .095	- .017		

Regarding **dictators' offers** there are significant differences between people who have a strong or a weak fear of self-assertion. In line with our expectation and as indicated by the positive correlation between offers in the dictator game and scores on fear of self-assertion in Table 1.5, those people who have a strong fear of self-assertion send higher amounts to their partners. Another significant difference is found between people who are very apprehensive and people who are less apprehensive. As could also already be inferred from the correlation between dictators' offers and apprehension, very apprehensive people give more than less apprehensive people.

With regard to trustors' behavior, the tests confirm the influences already signaled by the correlation analysis. The amounts **offered by trustors** are significantly influenced by scores on the scale fear of norm-violation. If the fear of norm-violation is stronger, offers are higher. Offers are also higher for subjects who score high on fear of rejection than for those who score low on that scale. The third trait that influences trustors' decisions is hope for success. People with a stronger desire to achieve a success offer significantly higher amounts than people with a smaller value on that scale. Similar to the offers in the dictator game, offers in the trust game are also significantly influenced by the level of apprehension. More apprehensive subjects offer significantly more than less apprehensive subjects.

Comparing subjects with higher scores on a trait to subjects with lower scores on a trait reveals another effect that was not captured by the correlative analysis before: **responders' MAVs** are driven by scores on the scale dominance. As expected, more dominant subjects use their power to reject offers and announced higher MAVs than less dominant subjects. The influence of the scale apprehension becomes clear once more. Very apprehensive subjects have lower MAVs, which is a sign for their good will to get along with others and to make compromises in order to maintain a good relationship.

So far, it seems that the behavior in the economic games can at least partially be explained well by differences in personality. Thus it seems that we could summarize that despite the fact that not all the traits which were assumed to drive behavior actually turned out to be influential there is substantial evidence that different scores on traits can lead to different decisions in economic games.

However, this would not have been the whole truth. Besides the effects that are in line with our expectations, there is also quite a large amount of influences of traits on behavior that contradicts our assumptions. In many cases, there are significant influences of traits on behavior- but the direction of the effect is reversed. From a statistical point of view, in those cases we would have to say that our expectation was not confirmed. Nevertheless as the number is large, we think it makes sense to report them. We will deal with those unexpected findings in the next section in order to draw a complete picture of our results.

Result 4: The highest number of traits that influences decisions in the expected way is detected in trustors' behavior.
The trait that influences the highest number of games in the expected way is apprehension.

1.5.3 Unexpected Results and Discussion

Correlative Analysis

Equivalent to Table 1.5, Table 1.7 provides an overview of the correlations between traits and game decisions. **Offers in the dictator game** are positively correlated to scores on the trait dominance. This kind of relationship is unexpected. Instead of dominating the partner by sending low amounts of points, dominant people send higher amounts of points.

Offers in the ultimatum game are positively correlated to scores on the scale vigilance. We expected exactly the opposite because we guessed that vigilant senders would assume that responders want to take advantage of them. The only way to prevent this would be to offer smaller amounts. The data, on contrast, suggests that vigilant senders might have anticipated the exploiting behavior of responders and therefore offered even more in order to ensure that their offer will be accepted. This would mean that vigilant senders preferred incurring the risk that the outcome will be disadvantageous for them to incurring the risk that no agreement will be reached at all.

Next, we found a positive correlation between the fear of self-assertion and the **minimally accepted value** in the ultimatum game. Although people with high scores on that scale do not like to stand up against others, the amounts of points that they claim for themselves are high.

The influence of this trait is reversed with regard to the behavior of **trustees**. The correlation between fear of self-assertion and amounts sent back is negative. People with high scores on fear of self-assertion do only send back small amounts of money to trustors. This again is surprising since sending back small amounts signals that the trustee stands up for what he or she wants, i.e. money, and does not care much for the trustor. Therefore, subjects with low scores on fear of self-assertion should return small amounts, but not the other way around. Further, the amounts returned by trustees are significantly higher the more dominant a person is. This finding, again, is contrary to our expectation. It would have been more likely that dominant subjects want to demonstrate

their power and thus keep more points for themselves than less dominant subjects. However, our data contrast this assumption.

Table 1.7: Correlations between scores on trait scales and amounts sent in games.

	Interaction-Anxiety-Questionnaire		Multi-Motive-Grid				16-Personality-Factor Test				
	Fear of norm-violation (1)	Fear of self-assertion (2)	Hope for affiliation (3)	Fear of rejection (4)	Hope for success (5)	Fear of failure (6)	Social warmth (7)	Rule-consciousness (8)	Dominance (9)	Vigilance (10)	Apprehension (11)
DG Offer	.284	.355	-.192	-.227			-.231	.173	**.379**		.433
	(.128)	(.055)	(.319)	(.236)			(.327)	(.467)	**(.083)**		(.057)
UG Offer	.250	.130	.073	-.175	.031	.260	.338	-.099	.316	**.380**	-.099
	(.183)	(.492)	(.707)	(.363)	(.870)	(.166)	(.146)	(.679)	(.175)	**(.099)**	(.678)
TG Offer	.346	.170	.156	.406	.458	.145	.036	.269	.345	.137	.455
	(.061)	(.369)	(.420)	(.029)	(.011)	(.446)	(.880)	(.252)	(.136)	(.564)	(.044)
MAV	.221	**.331**	-.199	-.197	-.034	.040	.207	-.205	.204	.041	-.416
	(.241)	**(.074)**	(.301)	(.307)	(.860)	(.834)	(.381)	(.386)	(.389)	(.863)	(.068)
TG Back	-.297	**-.399**	-.063	.212			.317	-.243	**.647**		.033
	(.141)	**(.044)**	(.758)	(.298)			(.250)	(.384)	**(.009)**		(.907)

High scorers versus low scorers

As can easily be inferred from Table 1.8, in quite a large number of cases there was a significant difference between the behavior of low- versus high-scoring subjects that pointed into another direction as expected.

Table 1.8: Tests of subjects with high scores vs. subjects with low scores on personality scales.

	Interaction-Anxiety-Questionnaire	Multi-Motive-Grid				16-Personality-Factor Test					
	Fear of norm-violation (1)	Fear of self-assertion (2)	Hope for affiliation (3)	Fear of rejection (4)	Hope for success (5)	Fear of failure (6)	Social warmth (7)	Rule-consciousness (8)	Dominance (9)	Vigilance (10)	Apprehension (11)
DG Offer		+ .064	**+ .042**	**+ .039**					**- .085**		
UG Offer				**+ .095**					**- .078**	**- .070**	
TG Offer	+ .047			+/- .070	+ .019						+ .018
MAV		**- .047**							+ .095		- .083
TG Back	**+ .078**	**+ .057**						**+ .095**	**- .017**		

We expected that people with a stronger hope for affiliation would be more generous **dictators**. It turned out, in contrast, that those subjects who have a stronger need for affiliation offer significantly lower amounts of points. Further, we expected that a higher fear to be rejected and to be disliked by others would lead to higher offers in the dictator game. Here, too, the revealed effect points into the opposite direction. Subjects with a stronger fear to be rejected offer significantly less. Another effect that was not expected is found for the influence of dominance. Instead of dominating the partner by not sending many points, more dominant subjects send more. However, under the assumption that the concept of dominance is similar to the concept of power,

this finding is less surprising. Research on the influence of power on action has shown that powerful persons tend to be action-oriented (Galinsky et al., 2003) and to express positive affect (Fiske et al., 2010). Applying these insights to dominance, it is not surprising that dominant people offer points, i.e. take action and thereby show positive affects towards their partners.

With regard to **offers in the ultimatum game**, the influence of fear of rejection is similar to the effect that it caused in the dictator game. Subjects who have a stronger fear to be rejected make lower offers although this increases the possibility that the offer will be rejected. Also contrary to our assumption but again similar to the effect found in the dictator game, more dominant people make higher offers in the ultimatum game than less dominant people, i.e. again they take action. In line with the finding that the correlation between vigilance and offers in the ultimatum game is positive, very vigilant people make higher offers than less vigilant people. As pointed out before, this suggests that vigilant anticipate that responders will try to exploit them but prefer being exploited to ending up with no money at all.

Announcing high **MAV**s is a way to stand up for oneself and to exhibit strong self-assertion. However, we find that subjects who score high on that trait and are very self-assertive announce lower MAVs than subjects who score low on that trait.

There are four traits that influence **trustees'** decisions differently than expected. First, subjects who are afraid to violate norms are less cooperative and return lower amounts than subjects who are less afraid to violate norms. A reason for this finding might simply be the fact that cooperation is not perceived as the social norm in this game. Unfortunately, subjects were not asked for beliefs or what they considered to be the social norm. According to Bicchieri (2006), people comply with norms if one of the three following conditions is fulfilled. First, a person must perceive that a sufficiently large proportion of the society conforms to the norm. Second, a person must feel that a sufficiently large part of the society expects him or her to conform to the norm. Third, a person thinks that a sufficiently large part of the society expects him or her to conform to the norm or may sanction non-compliance. It might well be that in this setting none of these necessary conditions for norm-compliance was satisfied or the norm was not sufficiently salient. Therefore subjects with higher scores on fear of norm-violation might not have returned more. The second unexpected finding occurred with regard to scores on fear of self-assertion. Subjects with a stronger fear to act self-assertively send

back smaller amounts of points than subjects with less fear to act self-assertively, i.e. they do stand up for themselves. Third, and in line with the two results mentioned before but contradicting the expectations, subjects who were very rule-conscious returned less points than subjects who were less rule-conscious. Again, cooperation might not have been perceived to be the rule, or norm, in this game. Last, dominant people return more points than less dominant people. As pointed out before, the dominant trait tendency seems to generate activity.

Result 5: The highest number of traits that influences decisions in an unexpected way is detected in trustee' behavior.
The trait that influences the highest number of games in an unexpected way is dominance.

Result 6: There is no trait that influences decisions in all games- neither in the expected nor in an unexpected way.

1.6 Summary and Conclusion

Behavioral economists successfully apply *behavioral* measures such as the Ring Measure of Social Values to show how personality differences influence economic decision making (e.g. Van Lange 1999, 2000; Smeesters et al., 2003). In this study, we investigate whether standard *psychological* tests like *self-report* questionnaires and a *semi-projective* tool can reveal personality variables that influence decisions in standard economic games.

We detect a number of traits that affect players' behavior in the expected way. For example, apprehensive people who are very concerned with doing things right in the eyes of others offer significantly more in the dictator game and the trust game and accept significantly lower amounts in the ultimatum game than less apprehensive people. However, this trait does not seem to influence offers in the ultimatum game and back transfers in the trust game. In line with this finding, there are quite a few other relationships between traits and decisions that contradict what we expected. One reason for the unexpected results might be that subjects perceived the game situations and the appropriate behavior differently from what we supposed. Since subjects were not asked

for reasons for their behavior, their perceptions and beliefs about their partners' behavior it cannot be proved whether this assumption is true. The elicitation of perceptions and beliefs would therefore be an important part of future research.

Further, there is a weakness in our experimental design that we would like to mention at this point and that was due to budget restrictions: each subject acted in three different games and in two different roles. Thus, subjects engaged in quite a large number of decisions and we cannot rule out that hedging effects occurred across the different decisions. Such hedging effects might, besides the different structure of the three games, be the reason why we find that subjects' behavior is quite consistent across the games when we categorize players into types and allow for some variance within the single game decisions, but that the precise amount of points which subjects send often varies from one game to the next. On top of that the order of the games was not counterbalanced so that we cannot control for order effects. The noise that our design eventually caused could be the reason why we did not detect an overall pattern of traits that accounted for decision making across all games.

The fact that there was no trait that explained behavior in all games is in line with literature from the 1960s, stating that personality traits alone are not very good predictors for behavior (Mischel, 1968). More accurate predictions can be made if *interaction effects* between *personality* and *situational* variables are considered and if actions are repeated instead of singular (Ajzen, 1987; Bargh et al., 1988). In our study, about equally large shares of subjects filled in the IAF, the MMG and the 16PF but no subject filled in all three tests. This is another weakness of our design which diminished the power of the statistical tests and resulted in group sizes that were too small to search for such person-situation interaction effects with parametric statistical tools.

In future research, it is essential not only to include situational variables into the experimental design in order to gain a deeper understanding of the way traits influence economic decision making but also to pay attention to sufficiently large group sizes. Besides analyzing interaction effects between personality and situational variables it is also important to consider the *relevance* of the given personality variable to behavior in the specific context. A person's behavior will most likely only be influenced by an individual disposition if the contextual demand suggests that it is appropriate (Carlo et al., 1991).

Summing up, we see our work as a first step. The idea was to see which traits are relevant in this context and whether they can be detected with standard psychological tools. This aim was achieved since a number of relevant traits could be revealed. However, our results show that the analysis of personality influences on behavior is not trivial and that it is important to be aware of the potential pitfalls we mentioned above. The named improvements are implemented in the follow up study by Hoffmann et al. (2010).

Appendix

Abbreviations

DG Offer	Offer of dictators in the dictator game
IAF	Interaction Anxiety Questionnaire
MAV	Minimal amount accepted by responders in the ultimatum game
MMG	Multi-Motive-Grid
SVO	Social Value Orientation
TG Back	Coefficient of the slope of the amounts of points that trustees in the trust game announced to return for each possible amount received
TG Offer	Trustors' offer in the trust game
UG Offer	Offer of senders in the ultimatum game
16 PF	16-Personality-Factor-Test

Instructions

Dear participant,

welcome to the Elab at the University of Erfurt. Today you will participate in an experiment. The experiment consists of two parts. In part A you will play three different games. In part B you will be asked to complete a questionnaire.

Your payoff in this experiment is calculated as the sum of points you received in the three different games in part A. Each point will be converted into 0.20€. Additionally, you will receive 3.00€ for the completion of the questionnaire. You will make your decisions in this experiment anonymously. This means that no participant will be able to allocate which decision has been made by which person. The payment will be conducted anonymously one by one immediately after the game.

Please note that no communication is allowed during the experiment and that cell phones have to be turned off. If you have any question, please contact the experimenter after the instruction phase has been completed by raising your hand out of the cubicle.

<u>Rules of game 1:</u>
In this game there are two persons: the sender and the receiver.
The sender receives 10 points from the experimenter. The receiver does not receive any points. The sender decides how many of these 10 points he or she wants to send to the receiver. Points sent (X) will be subtracted from the sender's account and will be added to the receiver's account. After this, the game is finished.

Sender's payoff:	10-X
Receiver's payoff:	X

Every participant in this experiment will act in the role of the sender and announce the amount of points he or she wants to send (X= 0 to 10 points):

At the end of the experiment, half of all participants will be paid at random in the role of the sender; the other half will be paid in the role of the responder. You will not learn about the identity of your partner. You will be told about the amount of your payoff at the end of the experiment.
Instructions for the other games will be given after the first game has been conducted.

Rules of game 2:

In this game there are two persons: the proposer and the responder.
The proposer receives 10 points from the experimenter. The responder does not receive any points.
The proposer suggests how many of these 10 points he or she wants to transfer to the responder (X).
The responder can **accept** or **reject** this transfer:

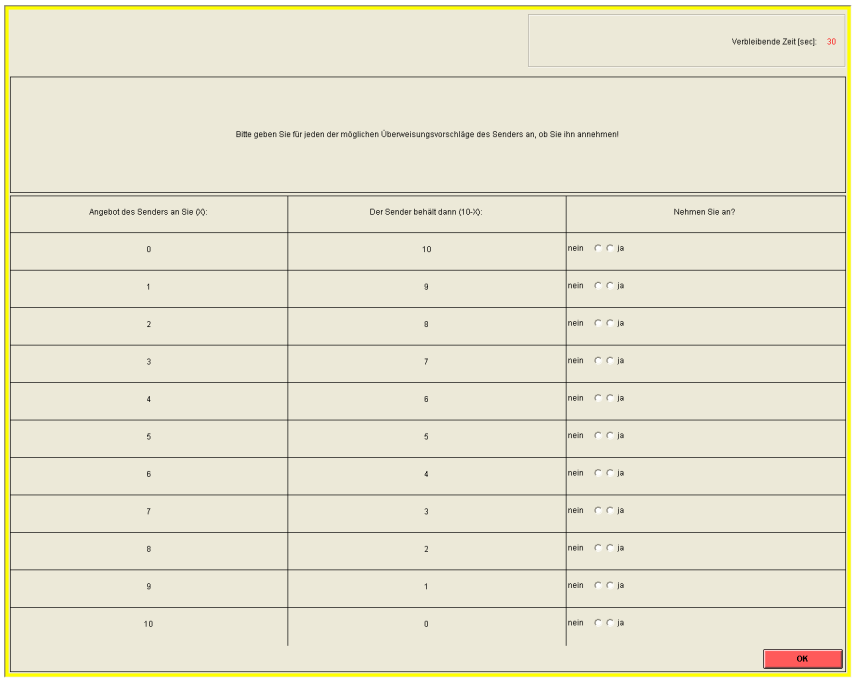
If the transfer is accepted, the 10 points will be split as announced by the proposer. **Sender's** payoff: 10–X **Responder's** payoff: X	If the transfer is rejected, the proposer and the responder will receive a payoff of 0 points. **Sender's** payoff: 0 **Responder's** payoff: 0

In this game you will act in both roles. In the role of the proposer you make a suggestion for the transfer (X= 0 to 10 points):

Sender's decision:

In the role of the responder you announce for each possible transfer from the proposer whether you want to accept or to reject it. Please indicate your decision for every row:

Responder's decision:



At the end of the experiment you will be paid for your decisions in both roles (proposer and responder). Your partner will be chosen randomly and will be different for both roles. Your payoff depends on the decisions that you and the partner that you are paired with have announced before.

Instructions for the last game will be given after the end of this game.

Rules of game 3:

In this game there are two persons: the trustor and the trustee.
Both the trustor and the trustee receive an endowment of 10 points from the experimenter.
The trustor decides how many points he or she wants to transfer to the trustee (X).
The trustee receives the **doubled** amount of the points transferred by the trustor (2·X).
The trustee decides how many points of the doubled amount he or she wants to return to the trustor. The trustor receives the amount sent back (Y) as sent by the trustee and **not** doubled.
The **trustor's** payoff is:

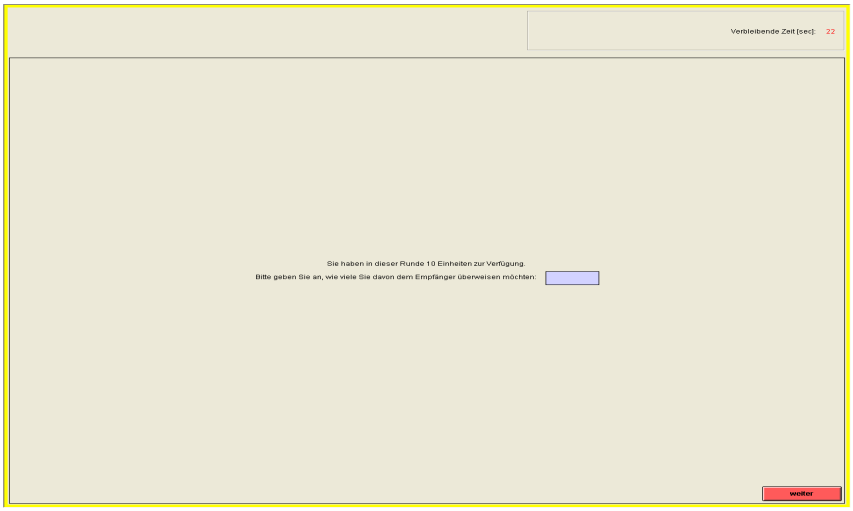
10	endowment
– X	transfer to the trustee
+ Y	back transfer received from the trustee

The **trustee's** payoff is:

10	endowment
+ 2·X	doubled transfer from trustor
– Y	back transfer to the trustor

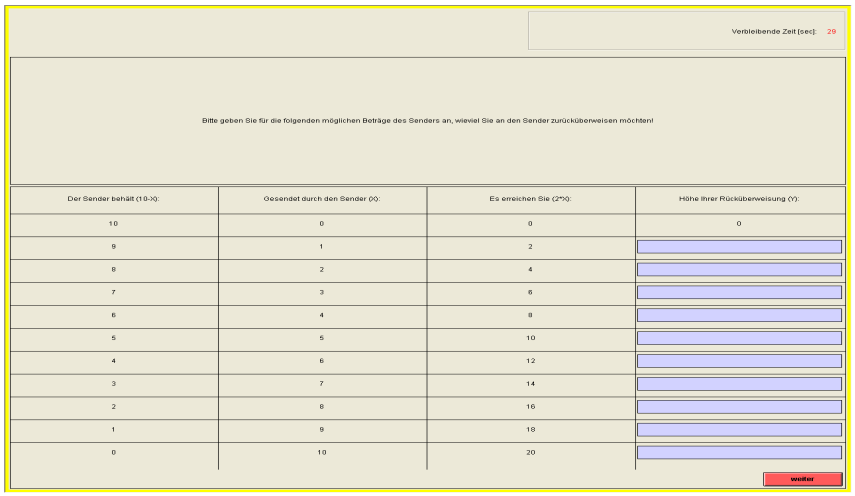
In this game you will act in both roles. In the role of the trustor you announce how much you want to transfer to the trustee (X = 0 to 10 points):

Sender's decision:



In the role of the trustee you announce for every possible transfer of the trustor how many points you transfer back. Please indicate your decision for every row:

Trustee's decision:



At the end of the experiment you will be paid for your decisions in both roles (proposer and responder). Your partner will be chosen randomly and will be different for both roles. Your payoff depends on the decisions that you and the partner that you are paired with have announced before.

Thank you very much for participating!

2 Person-Situation-Interactions in Economic Games[6]

2.1 Introduction

Economic decisions depend on individual characteristics of the decision maker. It is by now well established that not only monetary consequences but also social motives, i.e., the importance given to social aspects of the decision, influence how decisions are made in economic contexts. The role of social motives for economic decision making has been intensely studied and has led to a variety of models, for example on social value orientations (henceforth SVOs) and social preferences. SVOs describe the way people evaluate outcomes for themselves and for others and are relatively stable over time and across situations (Messick & McClintock, 1968). By classifying people as altruistic, cooperative, individualistic or competitive, the authors could successfully explain behavior in economic games and social dilemma situations. Regarding social preferences, it is known that individuals assign different weights to the importance of equitable payoffs (for an overview see Fehr & Schmidt, 2006). Advantageous as well as disadvantageous distributions reduce the utility of an outcome, albeit to individually different degrees (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000). Further, individuals find the intention that drives their partner's behavior important, as well. Kind actions are reciprocated and rewarded with cooperation while defective behavior is sanctioned with non-cooperative behavior (Falk & Fischbacher, 2006; Rabin, 1993).

Next to personality-based aspects, situational factors have been shown to influence economic decisions. Higgins et al. (1977) argue that the influence of situational factors depends on what concepts are accessible and applicable in a person's memory. In other words, actual facts are less important than the way these facts are individually processed. Presenting outcomes of formally equivalent situations either as losses or gains can lead to different preferences due to a shift in the reference point (Van Schie & Van der Pligt, 1995). For example, in a study by Idson et al. (2000), the price for a book is 65$ when paying with credit card and 60$ when paying in cash. Subjects report higher

6 Based on: "Person-Situation-Interactions in Economic Games" by Mareike K. Hoffmann, Bettina Rockenbach and Tilmann Betsch (2010), Working Paper, University of Erfurt.

levels of satisfaction with the purchase if the 5$ difference is labelled as a discount for paying in cash instead of a penalty for paying with credit card.

Kurt Lewin already proposed in 1935 that personal and situational variables do not operate independently from each other (Lewin, 1935). Instead, behavior depends on the interaction between persons and situations, a view that is now widely accepted among social psychologists. Different areas of research provide evidence that a "fit", i.e., compatibility between person and situation variables, determines behavior. It has repeatedly been shown that a person-job fit is strongly correlated with job-satisfaction and organizational commitment (Caplan, 1987; Kristof-Brown et al., 2005; Pervin, 1968). Research in the family domain has demonstrated that a fit between values of a person and the supplies in the environment available to fulfil these values leads to greater well-being (Edwards & Rothbard, 1999). Psychological research on pro-social behavior even provides evidence that the influence of altruism can only be comprehensively analyzed in the framework of a person-situation-approach (Carlo et al., 1991; Mischel, 2004; Romer et al., 1986).

Most research in economic decision making, however, has analyzed situation and personal effects separately. Neither standard economic theory nor theories of inequity aversion or reciprocity account for the possibility of an interaction between personal and situational factors. With this study we set out to begin filling this gap in economic environments. We analyze whether the influence of personality interacts with situational differences induced by priming. Our analysis is based on a model that accounts for interaction effects of person and situational variables and performs better in explaining behavior than a model that only focuses on the main effects of person or situation variables. The reminder of the paper is organized as follows. First we introduce the trust game and briefly review literature that deals with the influences of personality and situational variables on decision making. Section 3 describes the statistical models that we use for our analysis. The experimental setup is subject of Section 4, followed by the presentation of our empirical results in Section 5. The results are discussed in Section 6. Finally, Section 7 concludes.

2.2 The Trust Game, Personality Influences and Situational Influences

2.2.1 The Trust Game

We analyze economic decision making in the context of the trust game (Berg et al., 1995). Each of two players, the *trustor* and the *trustee*, receives an endowment of 10 tokens. The trustor decides how much of this endowment she will transfer to the trustee. The amount sent doubles on its way. The trustee, therefore, receives twice the amount sent and then decides if and how much he will return to the trustor.

Two players solely motivated by the maximization of their own profits do not exchange any points. The trustee maximizes his own payoff by not returning anything to the trustor. Anticipating this, the trustor does not send anything. Consequently, the players end up with their initial endowment, although joint profit would be maximized by trusting, i.e., sending 10 to the trustee. The ambivalence between the chance to increase payoffs by cooperating and the fear of being exploited by the partner inherent in the nature of the trust game makes it well-suited for the study of the influence of situational factors.

2.2.2 Personality Influences

Previous studies have shown that most people do not act as prescribed under the standard economic assumption of payoff maximization and that person factors such as SVOs are strong predictors of whether people tend to make decisions that maximize their own versus joint interests (Van Lange, 1999; 2000). Altruistic and cooperative people generally engage in pro-social behavior, i.e. they care for the maximization of joint outcomes, are interested in building and maintaining relationships and expend effort on behalf of the group (De Cremer & Van Lange, 2001; Giebels et al., 2003; Stouten et al., 2005). Compared to cooperatives, altruists are more extreme since they are even willing to sacrifice part of their own payoff if doing so increases their partner's well-being. Individualistic people maximize their own income regardless of their partner's outcome. Competitive people aim at increasing the difference between their partner's and their own payoff in order to be relatively better off (Van Lange et al., 1997). To pursue this goal, competitive people do not hesitate to take destructive actions that not only harm their partners but also themselves, i.e. they are even willing to sacrifice efficiency (Deutsch, 1985). Due to their absolute or relative primary concern for their own payoff, individualistic and competitive people are considered to be pro-selfish.

In economics, personality variables such as SVOs are usually assessed using behavioral measures. The most frequently used tool is the Ring Measure of Social Values (Liebrand, 1984). The Ring Measure is composed of 24 decisions about distributions of monetary amounts between the self and a partner. The procedure is extremely close to the economic decisions that are analyzed in these studies later on, as it also deals with the allocation of amounts of money. The fact that predicted and predicting variables originate in the same domain may be confounding. Therefore, we analyze differences in personality using measures that are proposed by psychologists. Psychologists refer to differences in personality as *traits*. Traits are measured with self-report questionnaires, which are developed following specific guidelines that guarantee high statistical validity and reliability (American Psychological Association, 1999). Apart from the different assessment methods, traits are similar to SVOs because they also refer to stable individual differences in personality. However, they paint a more detailed picture because they include a broader variety of personality aspects than SVOs, e.g. liveliness, creativity and vigilance. Recent studies prove the success of using psychological tools such as self-reports to explain economic decision making, e.g. with regard to influences of emotions (Ben-Shakhar et al., 2007). Researchers both of the field of economics and psychology emphasize the advantages of this interdisciplinary approach (Hertwig & Ortmann, 2001; van Winden, 2006).

Since the trust game is a game of social interaction, we analyze the influence of personality with regard to the two social orientations that lead to a direct motivational conflict in the game, namely *altruism* and *competition*. Altruists gain utility from the mere act of doing something good for others, even if they themselves do not obtain monetary profits from their behavior. As there is no guarantee that sent points will be reciprocated, altruism might be an important personality variable in the trust game. For the same reason, sending points implies the risk that the relative difference between the number of one's own and the partner's points is enlarged in favour of the partner. Since this is exactly what competitive people seek to prevent, competition might also be an important personality variable in this context. The third personality variable that we consider is *vigilance*. Vigilance is not only confined to social aspects but rather reflects a general behavioural tendency. Vigilant people do not trust in other people and are suspicious that something harmful might happen to them in all kinds of situations. The focus on vigilance allows us to assess whether a personality variable that does not

involve a motivational conflict but rather displays a general behavioural tendency also affects trustors' decisions, i.e. whether vigilant people make lower offers.

2.2.3 Situational Influences

As pointed out before, the influence of situational factors depends on the accessibility and applicability of the information that is given in a particular situation, i.e. how it is perceived (Higgins et al., 1977). Perceptions can be influenced by two techniques: framing and priming. *Framing* refers to differences in the salience of situational aspects. The more salient specific facts are, the more likely they will be taken into account during decision making. For example, Eckel & Grossman (1996) show that the willingness to donate depends to a great extent on the recipient. If the recipient is perceived as "deserving", donations substantially increase. *Priming* is the activation of previously learned cognitive structures and increases the accessibility of concepts within memory (Bargh et al., 1988). For example, the priming of an extreme trait category (hostility) can lead to an assimilation of the judgement of an ambiguous target into the priming-consistent direction (Stapel et al., 1997). Burnham et al. (2000) demonstrate that priming subjects' mental mechanism in a trust game by labelling their counterpart as a "partner" instead of an "opponent" increases both trust and trustworthiness. Further, the activation of a religious concept leads to more prosocial behavior in the dictator game (Shariff & Norenzayan, 2007). Emotions and mood can be affected by priming in a similar way. Subjects who saw a funny movie reported a good mood before participating in a gift-exchange game and acted significantly more generously than subjects who had seen a sad movie and reported a bad mood. On the other hand, subjects in a bad mood behaved significantly more reciprocally than subjects in a good mood (Kirchsteiger et al., 2006).

Situational perceptions can also be influenced by priming the regulatory focus. According to regulatory focus theory, people differ on how they attain goals by pursuing either a *promotion* or a *prevention* strategy. The strategies differ in the needs they serve (Camacho et al., 2003). If the primary need is accomplishment and growth, self-regulation operates in relation to hopes and aspirations and the focus is on *promotion*. People in a promotion focus search for positive outcomes and try to achieve gains. They pursue their goal attainment by eagerness means, i.e. they try to ensure hits and want to ensure against errors of omission (Higgins, 2000). If, on the contrary, the primary need is safety and protection, self-regulation operates in relation to duties and

responsibilities and the focus is on *prevention*. People in a prevention focus try to ensure against the presence of negative outcomes and fulfil their oughts. They achieve their goal attainment through vigilance means, e.g. ensuring correct rejections and ensuring against errors of commission or false alarms.

In the trust game, trustors are biased towards either daring to make positive offers in order to increase wealth or keeping their endowments to avoid the possibility of being taken advantage of by their partners. This bias makes the game particularly well suited to analyze the influence of situational differences. The tendency to dare is addressed by the promotion priming, while the tendency to protect is addressed by the prevention priming.

2.3 The Models

2.3.1 A Simple Model Versus an Interaction Model

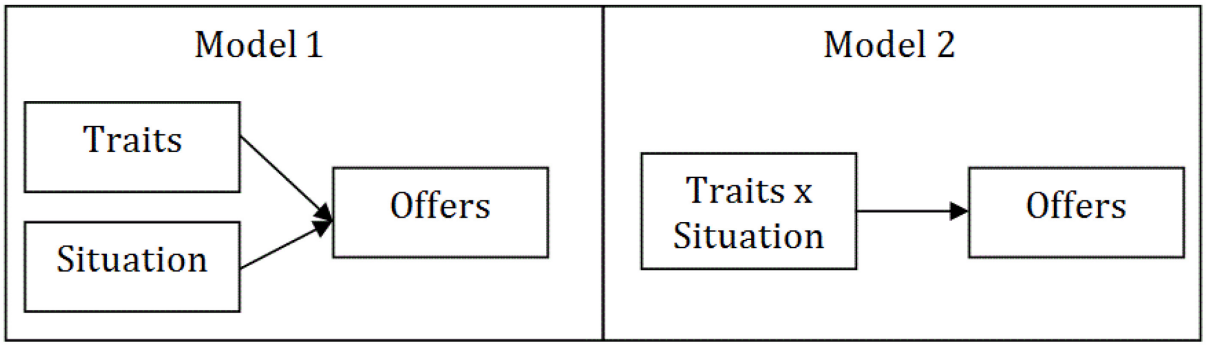


Figure 2.1: Comparison Model 1 and Model 2.

Figure 2.1 shows the two models that we compare. The dependent variable in both models is the average of trustor offers across all 10 rounds. Model 1 reveals the main effects that the independent variables vigilance, altruism, competition and the situation priming have on trustors' decisions. Model 2 accounts for the fact that the influence of vigilance, altruism and competition might depend on the situation and analyzes the influence of those variables separately for the two priming treatments.

The major body of research in behavioural economics considers personality-based or situational influences but neglects their interaction, as shown in model 1. If behavioural theories on social preferences and inequity aversion are comprehensive, and if it is true that personality-based and situational variables work independently from each other, both models will lead to the same results.

The theory on person-situation interaction that is currently widely accepted in social psychology assumes that person-based and situational variables mutually influence each other, as shown in model 2. If this model is a good predictor of reality, model 2 will outperform model 1 in explaining the variance found in trustors' decisions.

2.3.2 The Influence of Vigilance, Altruism and Competition

As no theory predicts how specific characteristics affect economic decision making, we expect that the influence of particular personality variables on behavior in our trust game is similar to what is described as "trait-typical" behavior by psychologists as well as findings previously reported by economists (for instance, De Cremer & Van Lange, 2001; Van Lange, 1999; 2000).

Vigilant people fear being exploited by others and do not easily trust (Schneewind & Graf, 1998). As any point offered to the trustee might never be returned, the influence of vigilance on offers is likely to be negative so that higher scores on vigilance lead to smaller amounts offered. The influence of this trait could be more pronounced if situational cues suggest protective behavior, i.e., in the prevention treatment, because the activation of the concept of security and protection creates a fit between the vigilant predisposition and situational circumstances. This might hold especially for highly vigilant people, just as studies on anxiety show that people with a high level of anxiety are more scared by situations that induce threat than people with low trait anxiety (Endler, 1975; Spielberger, 1972).

Altruists care for other people's well-being and even act generously if only their partner benefits from that action, because they gain utility from the other's improvement. This issue is present in the trust game, since trustors cannot ensure that trustees will return any points. Hence, the influence of the trait altruism on offers should be positive, indicating that higher levels of altruism are linked to higher offers. In the promotion treatment, this effect is likely to be increased because here the concept of accomplishment and growth is activated. Accomplishment and growth in terms of a monetary increase can only be achieved if points are offered. Offering points is congruent with altruists' behavior anyway, so the additional stimulus of growth that is elicited by the promotion priming should create a person-situation fit. Therefore, the influence of altruism on offers is supposed to be stronger in the promotion treatment.

A similar reasoning can be applied to the influence of *competition*. Competitive people want to ensure that their partner is not better off than they are and aim at

maximizing the difference between their own and their partner's payoff. The only way to prevent trustees from being better off is to not give any of one's points. Therefore, the influence of competition on offers should be negative, in that offers become smaller as the level of competition rises. This effect should be even larger in the prevention than in the promotion treatment, since the focus of attention is additionally driven to security and protection.

We concentrate on trustors' behavior, because we expect the influence of traits to turn out more clearly in a situation with uncertainty about the partner's action. According to psychological research, the type of a situation determines whether traits have an influence on behavior. The predictive power of traits is only strong in "weak" situations, which contain uncertainty and lack hints on what action would be appropriate (Snyder & Ickes, 1985). Monson et al. (1982) show this in a study on the effect of extraversion on talkativeness. Extroverts are more talkative than introverts in "weak" situations but not in "strong" situations that do not contain any doubt about correct behavior. In the trust game, uncertainty is only present for the trustor, as it is impossible for her to know how much the trustee will return.

2.4 Method

Participants and Design

The experiment was conducted with a total of 96 students (average age 22 years, 63% females) of different majors at the University of Erfurt. Participants were invited via the electronic recruitment program ORSEE (Greiner, 2004). The experiment was programmed with the experimental software z-Tree (Fischbacher, 2007). The study had a single-factor (situational prime: promotion vs. prevention) between-subjects design. Participants were randomly assigned to the promotion or the prevention priming procedure. In each priming treatment, half of participants were randomly assigned to the role of the trustor, while the other half were assigned to the role of the responder. Roles were kept constant and anonymous during all rounds. The average earning was 13.60€ and consisted of a flat fee of 6€ for completing the personality questionnaires and 0.04€ for every point in the trust game. Additionally, participants were offered the chance to receive their individual profiles of the 16-Personality-Factor-Test (henceforth 16 PFR; Schneewind & Graf, 1998).

Procedure

Participants came to the laboratory twice. In the first meeting, personality structures were assessed with the 16 PFR and with a self-report on social motives. The 16 PFR is a multidimensional measure of normal-ranged personality. For a detailed description of the tests see Appendix A. One week after the personality assessment, subjects returned to the laboratory and played the trust game. Immediately before playing the trust game, situational perceptions were manipulated by applying the regulatory focus priming proposed by Camacho et al. (2003). In accordance with Camacho et al.'s routine, a *promotion* focus was primed by asking participants to answer three questions related to accomplishment and growth taken from the *Regulatory Focus Questionnaire* (Higgins et al. 2001). A *prevention* focus was primed by asking participants to answer three questions related to safety and protection (see Appendix B1 and B2 for the two priming tasks). After the priming procedure, the instruction for the trust game was read aloud by the experimenter and there was room for questions[7]. The trust game was played for ten rounds in order to enhance the reliability of mean offers. To avoid learning effects, we did not provide feedback between rounds. In every round each participant received an endowment of 10 points and was randomly matched to a new partner. After playing the last round, participants were provided with a history of their own and their partners' decisions in all rounds, debriefed, paid anonymously, and thanked.

2.5 Results

2.5.1 Sample

Subjects' scores on the scales vigilance, altruism and competition do not differ between the promotion and the prevention treatment (all p's > .30, Mann-Whitney-U Tests). Thus, differences in the influence of vigilance, altruism and competition on trustors' offers between the two treatments are not due to different samples.

2.5.2 Comparing the Models

The models with and without interaction effects were computed using an ordinary least squares regression analysis in order to estimate the effects of traits and situation on trustors' behavior. In both models, the dependent variable is the average trustors'

7 Instructions to the trust game are provided in Appendix C.

offer over all 10 rounds. Subjects' scores on the scales for altruism, competition and vigilance serve as the independent variables.

Model 1 only considers main effects of traits and situation and omits interactions. Model 2 accounts for interaction effects and reveals whether and to what extent the influences of traits *and* situational contexts drive trustors' decisions. The variable 'promotion' serves as a dummy variable for the two different ways of situational priming. It is becoming 1 for participants in the promotion treatment and 0 for participants in the prevention treatment. Hence, the prevention treatment is the baseline category in model 2 and the coefficients of the predictor variables altruism, competition and vigilance show the influence of those traits on offers only in that treatment. The interaction terms measure the difference between the influence of a trait in the promotion and in the prevention treatment. The influence of a trait in the promotion treatment can be calculated by adding the non-standardized coefficient of the influence in the prevention treatment and the non-standardized coefficient of the interaction term. The results are shown in Table 2.1.

Table 2.1: Estimation of the influence of the traits vigilance, competition and altruism and the situational factor on trustors' offers.

	Model 1			Model 2		
Adj. R^2	.130			.419		
	Unstandardized Coefficients		Standardized Coefficients	Unstandardized Coefficients		Standardized Coefficients
	B	SE	ß	B	SE	ß
Vigilance	-.53**	.23	-.33**	-.73**	.24	-.45**
Altruism	-.11	.44	-.11	.75*	.43	.25*
Competition	-.29	.34	-.13	-.07	.38	-.03
Promotion	-1.42	.87	-.23	-.98	.72	-.16
Vigilance x Promotion				.70*	.40	.27*
Altruism x Promotion				-3.40***	.81	-.60***
Competition x Promotion				-.93	.58	-.27

Note: * $p < .10$, ** $p < .05$, *** $p < .001$

The amount of explained variance (adjusted R^2) increases from .13 in model 1 to .42 in model 2, which indicates that the model with interaction effects outperforms the model without interactions.

In model 1, the only trait that has a significant influence on trustors' decisions is vigilance (B= -.53, $p < .05$). The negative prefix of the coefficient shows that offers become smaller the more vigilant a person is. The regression coefficient of the dummy variable "promotion" shows that offers are smaller in the promotion than in the prevention treatment (for the development of offers over periods, see Figure 2.2). However, the influence of the different situations does not reach the level of significance (B= -1.42, $p > .10$). Considering only the main effects of traits and situation in the analysis wrongfully leads to the conclusion that trustors' decisions are not significantly influenced by altruism, competition or the situation itself.

In model 2, the coefficient of the dummy variable "promotion" also reveals that offers are generally higher in the prevention treatment. As in model 1, the difference is not significant (B= -.98, $p > .10$). Regarding personality variables, the coefficient of the trait vigilance in model 2 is negative and significant (B_{Prev}= -.73, $p < .05$), showing that higher scores on vigilance indeed lead to smaller offers in the prevention treatment. This is in line with our expectation that the influence of *vigilance* on offers is negative and pronounced more strongly in the prevention than in the promotion treatment. The interaction term of vigilance and promotion is positive and weakly significant. This indicates that the influence of vigilance is not the same in the two treatments (B_{diff}= .70, $p < .10$). Adding the coefficient of vigilance in the prevention treatment and the coefficient of the interaction term reveals the influence of vigilance on offers in the promotion treatment (B_{Prom}= -.04, $p > .10$). Thus, the influence of vigilance on offers in the promotion treatment is less negative than in the prevention treatment.

With regard to *altruism,* we conjectured that the influence on offers would be more positive in the promotion than in the prevention context. The interaction term of altruism and promotion in model 2 indicates that the influence of altruism is indeed significantly different between the two treatments (B_{diff}= -3.40, $p < .001$). In the prevention treatment, altruism has a positive, weakly significant effect on offers (B_{Prev}= .75, $p < .10$). However, in contrast to our expectation, in the promotion treatment the influence of altruism is significantly negative (B_{Prom}= -2.65, $p < .001$).

The influence of *competition* was expected to reduce offers more strongly in the prevention context than in the promotion context. The interaction term of competition and promotion shows that the influence of this trait is not significantly different between the two treatments (B_{diff}= -.93, $p > .10$). In the prevention treatment, the

influence of competition on offers is negative but not significant (B_{Prev}= -.07, p > .10). In the promotion treatment, the effect of competition is significant and negative (B_{Prom}= -1.00, p < .05).

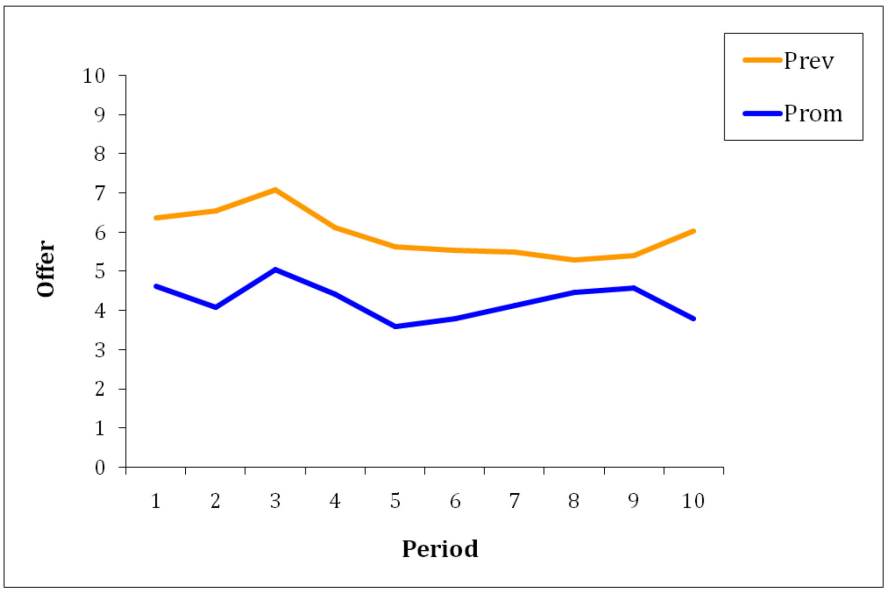


Figure 2.2: Development of trustors' offers by treatment.

2.6 Discussion

Despite the common definition of traits being relatively stable individual differences over time (Guilford, 1973), our analysis shows that the influence of traits on economic behavior can differ depending on the context. We find that person and situation effects interact. Controlling for the larger number of variables, the model that exclusively accounts for main effects of person and situation is clearly outperformed by the model that also accounts for interaction effects. Only focusing on main effects leads to a loss of explained variance in trustors' behavior, since important effects are not detected.

According to model 1, vigilance is the only trait influencing trustors' behavior. Model 2 shows that this conclusion is too superficial, as the influence of altruism on offers clearly exists, but is only revealed if person-situation interaction effects are considered. With regard to the direction of the interaction effects, our results are mixed.

The general personality variable *vigilance* has a stronger negative effect on trustors' offers when a prevention focus is primed than when a promotion focus is primed. The influence of the inherent vigilant orientation becomes stronger if situational cues additionally activate the concept of protection. On the other hand, if the focus is shifted to daring and risk-taking in order to achieve gains like in the promotion priming, the

influence of vigilance on offers becomes lower. This finding is in line with results from research on person-situation fit (for instance, Carlo et al., 1991; Edwards & Rothbard, 1999; Romer et al., 1986), as the idea to protect creates a better fit with vigilance than the idea to incur risks.

However, the influence of personality variables that relate to social motives like *altruism* and *competition* is moderated by the situational context in a different way. In the prevention treatment, higher scores on altruism have a positive influence on offers. In the promotion treatment, the influence on offers is negative. Here situational cues that contradict the inherent orientation do not simply lower the influence of that personality variable on behavior, as the promotion cues lowered the negative influence of vigilance. Instead, if cues contradict the inherent orientation, as is the case when altruism meets prevention, behavior is more consistent with that orientation than when it is aligned with the situational cues. A possible reason for this might be that participants are exposed to a motivational conflict between the social motive altruism and situational cues in the presence of a situation of social interaction. On the one hand, altruists want to help other people, i.e. offer points. On the other hand, situational cues in the prevention treatment suggest protective behavior, i.e., retaining points. This motivational conflict might elicit an action that is consistent with the dominant response. According to the theory on dominant responses (Zajonc, 1966), people who are in situations of physiological arousal, e.g., due to the presence of others, are likely to act in a way that is consistent with their dominant response. The dominant response of an altruistic person is to send a large amount, since he or she is mostly interested in the partner's wellbeing. If such a person is primed with the prevention focus, he or she might feel urged to keep the points. This conflict with the person's "natural" predisposition could – next to the presence of the other subjects in the laboratory – lead to an increase in his or her physical arousal. As a result, the dominant tendency to act altruistically might be increased.

A reason for the finding that altruism has a significant negative effect on offers in the promotion treatment- although situational cues and social orientations are aligned- might be that altruistic people consider pro-social behavior to be a common standard and feel aggrieved if they perceive to be pushed. They possibly want to treat other people in a friendly manner, but only if they do so voluntarily and not if they feel forced. Gneezy & Rustichini (2000) compare situations with monetary incentives to situations

without incentives and report that performance can be reduced by monetary incentives due to a crowding out of intrinsic motivation. Perhaps the promotion priming led to a crowding out effect of intrinsic altruism. It is also possible that the activation of daring behavior leads to egoistic reactions in altruistic people. For such individuals, daring might mean *not* to act altruistically, as this is a challenge for them since it is in strong contrast to their typical behavior.

The finding that the negative influence of *competition* on offers is more strongly pronounced in the promotion treatment than in the prevention treatment is also in line with the theory on dominant responses (Zajonc, 1966). The reasoning here is similar to the one outlined above for altruism. Again there is a conflict between a social motive and situational cues in the presence of a situation of social interaction. Competitive persons attempt to maximize the difference between their own and their partner's outcomes. The dominant response would be to not cooperate, since not offering any points is the only way to make sure that one does not end up with fewer points than the partner. If competitive people are primed with the promotion focus, i.e., if they are encouraged to cooperate, this again could lead to a conflict that causes physiological arousal and enforces the dominant response. Thus, the influence of competition on offers is more negative in the promotion treatment than in the prevention treatment.

Moreover, this finding is similar to Smeester's (2003) result that highly pro-selfish people cooperate less when they are exposed to a morality priming. Instead of becoming more moral, they end up being even more selfish. In our setting, the promotion priming should have elicited higher offers, because participants' focus is on accomplishment and the gains they could achieve by cooperating with their partner. Thus, our idea was to encourage them to offer more. Maybe the reverse was provoked and competitive participants were induced to behave even more competitively due to the promotion priming, just as Smeester's participants were induced to act even more pro-selfishly in the morality priming.

The last finding that deserves attention is the general tendency of offers to be higher in the prevention than in the promotion treatment. This result is remarkable, since we expected exactly the opposite. The promotion priming procedure was supposed to elicit daring behavior and provoke a desire to realize the gains that were possible by cooperating. Since we did not ask subjects to justify their behavior, we can only guess about the motivation for their decisions. One explanation might be that the priming did

not work the way we expected it to. The questions of the priming addressed subjects individually. Perhaps this motivated participants in the promotion treatment to attempt to maximize their own rather than joint gains. In this case, keeping points would be rational, since points that are kept are assured profits. Nevertheless, we have to admit that this does not explain why subjects in the prevention treatment offered more. An explanation for higher offers in the prevention treatment might be given by Herr (1986; see also Neuberg, 1988) in an earlier study. According to Herr (1986), beliefs about partners' actions are important in connecting primes with cooperative behavior in mixed-motive interdependence situations. Since we did not ask for beliefs, we cannot determine whether and in what way the priming procedures affected subjects' expectations about their partners' behavior. Therefore, in future research, subjects should be explicitly asked to report their beliefs and motivations.

2.7 Conclusion

The paper contributes to the existing literature on economic decision making by providing support for the assumption that behavior is a function of personality *and* situation. We show that the common practice of only analyzing main effects of traits *or* situation in economic research may be at the cost of explanatory power. If these interaction effects are neglected, important differences in the influence of traits on behavior might not be detected. Our results are partially in line with psychological literature on person-situation interaction effects.

We find that situational cues affect behavior and that in a situation of social interaction the influence of traits on behavior is stronger if there is a fit between individual traits and situational circumstances than if situational circumstances contradict the inherent orientation.

However, this finding only holds for non-social personality variables that display a person's general tendency to act, such as vigilance. If personality variables are associated with social aspects, such as altruism and competition, and the situation requires social interaction, the effect is reversed. Here, actions are even closer to trait-typical behavior if situational circumstances conflict with individual traits than when there is an alignment of circumstances and traits. We assume that this effect results from a motivational conflict that induces the elicitation of the dominant response. This

motivational conflict is absent if personality variables are generalized and not confined to social aspects.

Appendix

A Personality Assessment

16 Personality-Factor Test

The 16 Personality-Factor Test (Schneewind & Graf, 1998) is a global personality test that assesses differences between individuals' personalities on 16 primary scales which can be subsumed into five global scales. The 16 primary scales constitute answers to 184 questions from different areas. Primary scales are warmth, reasoning, emotional stability, dominance, liveliness, rule-consciousness, social boldness, sensitivity, vigilance, abstractedness, privateness, apprehension, openness to change, self-reliance, perfectionism and tension. The five global scales are extraversion, independence, self-control, anxiety and tough-mindedness. Although we were interested only in the scale vigilance, for completeness sake, we conducted the whole test with all 184 items in order to not bias results.

Example scale vigilance:

"It takes me a long time to trust in another person."

- agree
- don't know
- disagree

Self-Report

In order to develop a measure that is even closer to the economic games than the general personality test, subjects were assessed on six social motives. The motives were competition, cooperation, individualism, altruism, aggression and fairness. Participants were asked to rate two statements for each motive on a 7-point-Likert scale. One question of each couple of statements was taken from a well known personality test (NEO-PI-R, Ostendorf & Angleitner, 2004; HPI, Andresen, 2002).

Example scale altruism:

"I stop doing my things in order to help others as much as possible."

not at all • • • • • • • totally agree

The score on each motive is assessed by calculating the mean of the two statements. The complete personality tests and questions are available from the authors upon request.

B1 Promotion Priming Task

Your personal code: _____

Please answer the following questions. Take your time and give the answer to each question with a full sentence. You will have 10 minutes for this task.

1) Please tell us about a time in your past when you felt like you made progress toward being successful in life.

2) Please tell us about a time in your past, when compared to most people, you were able to get what you wanted out of life.

3) Please tell us about a time in your past, when trying to achieve something important to you, you performed as well as you ideally would have liked to.

B2 Prevention Priming Task

Your personal code: _____

Please answer the following questions. Take your time and give the answer to each question with a full sentence. You will have 10 minutes for this task.

1) Please tell us about a time in your past when being careful has avoided getting you into trouble.

2) Please tell us about a time in your past, when growing up, you stopped yourself from acting in a way that your parents would have considered objectionable.

3) Please tell us about a time in your past when you were careful not to get on your parents' nerves.

C Instructions Trust Game

Instructions:

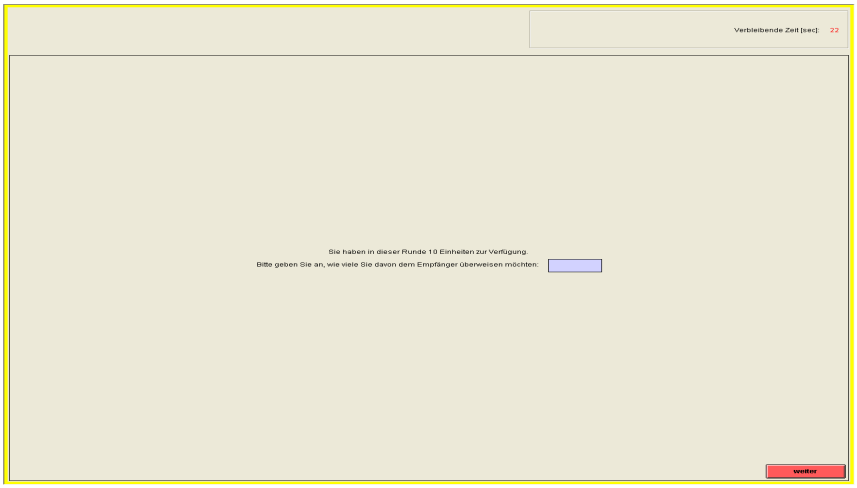
- There are two players in this game: one sender and one responder.
- Each player receives 10 points.
- The sender decides how many of his/her 10 points (X) he/she wants to send to the responder.
- The responder receives **twice** the amount sent (2·X).
- The responder decides how many of his/her points plus the number of points he/she received from the sender he/she wants to return to the sender. The sender receives the actual amount sent, not a multiplication (Y).
- The sender's payoff is calculated as:

10 endowment
– X number of points sent to responder
+ Y number of points returned by the responder

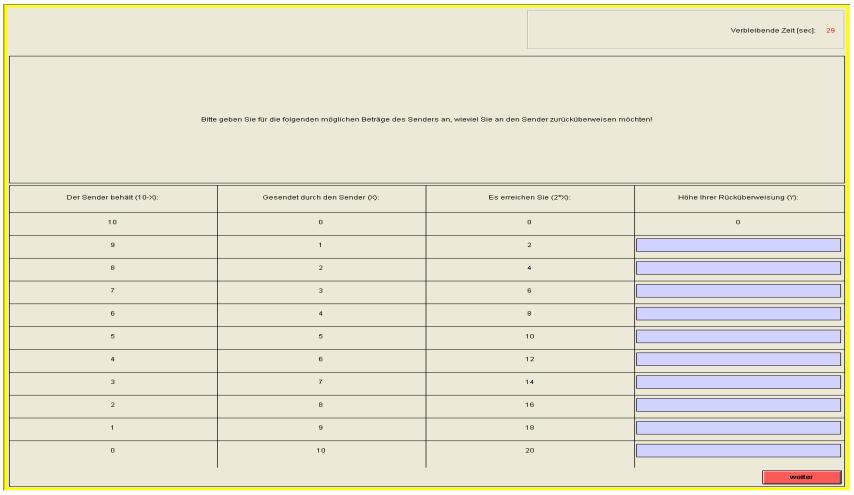
The responder's payoff is calculated as:

10 endowment
+ 2·X twice the amount received by the sender
– Y amount returned to the sender

- Half of you will be randomly assigned the role of the sender, the other half the role of the responder.
- If you are the sender, you make a decision about the number of points you send to the responder (X = 0 to 10 points).



- If you are the responder, you announce how many points you want to return for each of the amounts that could have been sent by the sender. Please indicate your decision for every row.
-



- You will play this game for ten rounds.
- You will randomly be assigned to a new partner in every round.
- For each point gained in this experiment, you will be paid 0.04€ after the last round.

3 Decision Styles and the Stability of the Ring Measure of Social Values[8]

3.1 Introduction

Experimental research has shown that behavior in situations of social interdependence is substantially driven by individual differences in social value orientations. A social value orientation (SVO) is defined as a personality trait that reflects preferences for the allocation of outcomes between the self and others (Messick & McClintock, 1968). Differences in SVOs can serve as important predictors for decisions about cooperative behavior (Kollock, 1998; McClintock & Van Avermaet, 1982). For this reason, the assessment of SVOs is a fundamental part of many studies. Even though there is consent regarding the explanatory power of the concept of SVOs, almost no research has been done on the *way* SVOs are generally assessed. In economic studies, the most commonly applied tool is the Ring Measure of Social Values (Liebrand, 1984). Therein, participants must make several decisions about how amounts of money should be divided between him-/herself and an (anonymous) partner. Highly pro-social people care a lot for others and dedicate large amounts to their partners. People who are more self-oriented, on the other hand, choose allocations that ensure high total payoffs for themselves. The application of the Ring Measure elicits preferences that can be seen as a hierarchy of aims regarding outcomes over the self vs. others. It is the goal of this study to test whether, and to what extent, the results of these assessments of SVOs can be affected by differences in decision styles.

According to research on decision making, behavior and also the stability of aims can be influenced by the type of decision strategy applied. C. Betsch et al. (2004) showed that a deliberate (as compared to an intuitive) decision style can lead to a shift in the hierarchy of aims. The shift is due to stronger cognitive activations which induce a broader consideration of facts, including facts that were initially irrelevant for the decision (Wilson & Schooler, 1991; Wilson et al., 1993). In line with C. Betsch et al. (2004), we propose that, due to an increased cognitive process, SVOs are less stable if

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the decisions necessary to assess the SVO are made deliberately as compared to intuitively. We define stability as the difference between a prior measurement of the SVO with no specific instruction on how to make the choices assessing the SVO and a second measurement with specific (deliberate or intuitive) instructions. Thus, we expect the difference between those two measurements to be larger in the deliberate group than in the intuitive group. Moreover, the more deliberate consideration should also effect that the single choices made by an individual for the assessment of the SVO are more similar to each other and show a more coherent pattern. This should result in a higher consistency of the choices that were made deliberately than of those that were made intuitively. We doubt that researchers are aware of these influences on the application of the Ring Measure and strongly suggest their consideration whenever SVOs are assessed. The next sections provide an overview of intuitive and deliberate decision strategies. Finally, the concept of SVOs, their behavioral consequences and methods of their assessment will be outlined.

3.1.1 Intuition and Deliberation as Decision Strategies

The long tradition of cognitive research on decision making (Busemeyer et al., 1995; Shafir et al., 1993) has recently been complemented by an growing interest in the role of affect and intuition (e.g., Damasio, 1994; Hsee & Rottenstreich, 2004; Loewenstein et al., 2001; Slovic et al., 2001; Zajonc, 1980; for a comprehensive overview see Plessner et al., 2007). Dual-process theories localize intuition and deliberation as strategies referring to two different information-processing systems, for example, System 1 (intuition) and System 2 (reasoning; Evans, 2003; Kahneman, 2003; Stanovich & West, 2000). System 1 processes are effortless and implicit (Kahneman, 2003). Their occurrence is rapid and automatic, and only their final product enters consciousness (Evans, 2003). Affect plays a crucial role in intuitive decision making, as it represents the quickly accessible reaction of System 1. In recent literature, intuition is defined as a ‘‘process of thinking. The input to this process is mostly provided by knowledge stored in long-term memory that has been primarily acquired via associative learning. The input is processed automatically and without conscious awareness. The output of the process is a feeling that can serve as a basis for judgments and decisions’’ (T. Betsch, 2007). Thus, intuitive decisions result from System 1 processing and can be spontaneous, fast, and based on quickly accessible affect. They reflect prior (implicit) learning experiences. System 2 processes, on the other hand, are more likely to be consciously monitored and

deliberately controlled, potentially rule governed and effortful (Kahneman, 2003). Therefore, deliberate decisions are results of more effortful System 2 processes and are slower and more reflected.

3.1.2 Social Value Orientations

During the last years, research on individual differences in SVOs has especially been conducted in mixed-motive contexts and social dilemma situations. A social dilemma is a situation of social interdependence in which collective interest contradicts individual interest. Rational for every individual would be to act selfishly and to free ride whereas the common payoff would be greatest if everyone cooperated. Differences in the SVO have been found to be strong predictors of whether people tend to make decisions that maximize their self versus collective interest (Van Lange, 1999, 2000). The predominating value orientations are pro-self and pro-social and have very distinct implications for behavior (De Dreu et al. 2000). Pro-selfs seek to maximize their own outcomes and tend to cooperate only if it serves their own self-interest (Van Dijk et al., 2004). Pro-socials assign greater importance to maximizing joint outcomes and are interested in building and maintaining relationships (Giebels et al., 2003; Stouten et al., 2005; Van Dijk et al., 2004). They are aware of the impact their behavior has on others and are more inclined to expend effort on behalf of the group (De Cremer, Van Lange, 2001). Pro-selfs can be further subdivided into people with individualistic or competitive value orientations. In order to maximize their own payoff, individualists either help or harm others, as long as they can increase their own personal benefits. Competitive people, on the contrary, seek to maximize their outcome relative to others' outcome. They do not strive to maximize their personal payoff but, rather, the difference between their own and their partners' payoff (Van Lange et al., 1997). Pro-socials can be further subdivided into altruists and reciprocal cooperators. Altruists are more concerned with positive outcomes for others than for themselves and even continue to cooperate when their partners defect. Reciprocal cooperators cooperate as long as their partner cooperates and end cooperation if their partner begins to defect (Kurzban & Houser, 2001). Most popular among the explanations for this behavior is that pro-socials have a greater concern for fairness (De Cremer et al., 2005) and a greater sense of social responsibility than pro-selfs (De Cremer & Van Lange, 2001).

SVOs are typically assessed using decomposed games (Kuhlmann & Marshello, 1975) or the Ring Measure of Social Values (Liebrand, 1984; Liebrand & McClintock,

1988). In this study, we apply the Ring Measure, since this tool is more common and precise. It consists of 24 decisions and yields a more detailed categorization of value orientation. In each of the 24 decisions, subjects are asked to indicate which of two alternative distributions of points between themselves and an anonymous partner they prefer. The Ring Measure will be described in more detail in the method section.

Research on the stability of SVOs is still relatively scarce and the results are quite heterogeneous. Kramer et al. (1986) introduced the concept of SVOs as a *trait*. A trait is defined as "any distinguishable, relatively enduring way in which one individual differs from others" (Guilford, 1973). Therefore, SVOs should be stable across different points of time and different situations. While some studies show the test-retest reliability to be moderate to sufficiently high for a trait (Sheldon, 1999; Swap & Rubin, 1983; Van Lange, 2000), others find that the stability strongly depends on the consistency of the choices made for their assessment (Smeesters et al., 2004; Smeesters et al., 2003). The test-retest reliability was only high for high consistent pro-selfs and pro-socials, not for low-consistent pro-selfs and pro-socials. In another study, Bekkers (2004) not only finds that test-retest reliability of subjects' SVO is only small to moderate, but also that it varies by age. Stability-coefficients were .28 for middle-aged people (30-50 years old) but only .12 for younger and .18 for older people. Brosig et al. (2007) show that subjects who repeatedly made decisions over the period of one year almost exclusively ended up acting pro-selfish, regardless of whether their initial behavior was cooperative or not. Moreover, there is evidence that SVOs are sensitive to simple framing techniques (De Dreu & McCusker, 1997; Griesinger & Livingston, 1973) and manipulations (Iedema & Poppe, 1994).

Despite the fact that the evidence of these studies is mixed, they almost exclusively analyze how SVOs are affected by differences in the situation or time. As far as we know, no study has been conducted to analyze the impact of the *way* the SVO is measured on the stability of the assessment, i.e. the procedural aspect. Previous research has shown that people who are asked to think about decisions start to focus on attributes which have not been important causes of their initial evaluations (Wilson & Schooler, 1991; Wilson et al., 1993). Thus, the application of a deliberate decision style can change the hierarchy of aims and lead to different choices than the application of an intuitive decision style (C. Betsch et al., 2004). Following this reasoning and bearing in mind that the Ring Measure is a tool that is entirely made up of decisions, it is important to know

under which circumstances the decisions that are taken for the assessment of a SVO were made. Subjects who apply a deliberate decision style while filling out the Ring Measure possibly make decisions that are different from the ones taken if an intuitive decision style is applied. The more deliberate consideration of facts might shift the initial focus of attention and result in less stable SVOs. Thus, we hypothesize that the stability of SVOs is lower when a deliberate decision style is applied during assessment than when an intuitive decision style is applied. On the other hand, the increased cognitive activation induced by the deliberate process could cause subjects to make more coherent choices within the Ring Measure. The choices might either become more benevolent regarding the partner's or one's own payoff. In any case, they should reveal an increased internal consistency as compared to the intuitive group. Thus, our second hypothesis is that the consistency of SVOs is larger in the deliberate than in the intuitive group.

3.2 Method

Overview

Participants' social value orientations were measured twice. First, the prevalent social value orientation was assessed by applying the Ring Measure of Social Values. The Ring Measure of Social Values was followed by a distraction task (d'', Brickenkamp, 2002). After working on the d'' for two minutes, the Ring Measure of Social Values was conducted a second time. This time, the applied decision strategy was manipulated by instructing half of participants to decide intuitively and the other half to decide deliberately. To avoid carry-over effects, the second Ring Measure of Social Values was slightly transformed. Subjects' were paid according to the decisions they had individually made in both Ring Measures.

As the first dependent variable, we calculated the difference between the two social value orientations for each subject in order to analyze the stability. The second dependent variable was the consistency between the choices that were made to calculate the SVO. We expected the stability of the social value orientation to be lower in the deliberate than in the intuitive group. Further, we analyzed whether differences in the social value orientations were driven by a greater or smaller concern for the partner or the self. Finally, we tested whether choices became more consistent in the second Ring Measure.

Participants and Design

One hundred sixty-eight students at the University of Erfurt, Germany, took part in the study (73.08% women, M_{age}= 22.32, SD= 3.46). Participants were invited via an electronical recruitment program and randomly assigned to the deliberate or the intuitive decision style group or a control group with no instruction regarding the decision style. Subjects were paired with one anonymous partner from their group.

Materials

The Ring Measure of Social Values. The original version of the Ring Measure consists of 24 alternative choices about distributions of money. Each alternative represents a choice between a pair of distributions for oneself (SELF) and another person (OTHER). The amounts to be distributed can be either positive or negative. An example is: "Chose between A: 3.94€ for you and 3.04€ for your partner, or B: 3.54€ for you and 3.54€ for your partner". Subjects decide which of the two alternatives they prefer. As all pairs of money share the property that "own^2+other^2"= constant (in our case 25000), they produce a circle with the horizontal axis depicting the outcomes for self and the vertical axis depicting the outcomes for other. Furthermore, across all 24 choices, the mean of all sums for own = mean of all sums for other = 0, which at the same time constitutes the origin of the circle. Social value orientations are determined by calculating the total amount allocated to the self and the total amount allocated to the other. Taking these two amounts as coordinates on the horizontal and the vertical axes leads to a single point in the circle. Between this single point and the centre of the circle a vector can be calculated. The *angle* between the x-axis and this vector (calculated by ArcTan Mean(other)/Mean(self)) is the estimate for the social value orientation. Subjects can be classified according to their angle. The most common categories are:

Cooperative: 22.5 < angle < 67.5

Altruistic: 65.5 < angle < 112.5

Competitive: 292.5 < angle < 337.5

Individualistic: 337.5 < angle < 22.5

The *length of the vector* is an estimate for a subject's consistency in choices. The shorter the vector, the more likely is the application of a purely random choice strategy. Therefore, it is common to exclude subjects from the analysis that fail to reach at least 60% of the possible length of the vector (Smeesters et al. 2003).

Compared to the original Ring Measure of Social Values the only difference in our study was that we raised the number of alternative choices from 24 to 32 in order to increase the precision of the measurement (van Dijk et al., 2002). Since we measured SVOs twice, we had to ensure that participants were not able to remember and repeat their decisions from the first Ring-test. Therefore, we transformed the Ring Measure of Social Values in the second round by multiplying every choice by the factor 1.2. This transformation did not affect the calculation or the allocation of the social value orientation categories as was ensured by our control group.

The preference for intuition and deliberation scale. People may be instructed to make choices deliberately or intuitively, but they can also have an inherent preference for a specific decision style. A method to test for the inherent preferred decision style is the preference for intuition and deliberation (PID) scale (C. Betsch, 2004, 2007). PID conceptualizes intuition as a basic decision mode that uses affect as a decision criterion. Deliberation is defined as a decision mode following explicit evaluation, beliefs, and reasons. The two independent subscales of PID measure an individual, stable preference for intuition (PID-Intuition), and a preference for deliberation (PID-Deliberation). The scale comprises 18 items, 9 indicating PID-Intuition (e.g., ‘‘My feelings play an important role in my decisions’’) and 9 items indicating PID-Deliberation (e.g., ‘‘I prefer making detailed plans rather than leaving things to chance’’). Participants express their agreement on a 5-point scale with 1 indicating ‘‘I very much disagree’’ and 5 indicating ‘‘I very much agree.’’ Both scales are usually negatively correlated (<.20); the reliability (Cronbach’s α) ranges between .76 and .81 for PID-Intuition and .76 and .79 for PID-Deliberation. The strategy preferences are stable over time, as the retest reliability after 6 months shows (PID-Intuition .76, PID-Deliberation .74).

Procedure

Subjects individually sat in front of a PC with a maximum of twelve participants at one time. The computer program instructed them that they would have to make decisions about how to distribute amounts of money between themselves and an anonymous partner (see Appendix for the instructions). The partner was selected randomly out of the present subjects. They were told that they would be paid according to their own and their partners' decisions and that they had an endowment of 1000 points. 100 points equalled 0.10€. After clicking on the "continue" button, 32 decisions successively appeared on the screen. The two options were displayed graphically as well as numerically (see Figure 3.1). Only after clicking on one of the two alternatives did the next choice appear. There was no chance to return to and revise a previous decision. After the final decision, the computer program instructed the participants how to complete the d" task (a distraction task), which was placed on a paper in front of them. After turning over the paper, their task was to mark the letter d with two strings out of a selection of distracter letters with or without strings (such as b" or d'; Brickenkamp, 2002). An audio alarm on their ear plugs signalled them individually to stop after two minutes.

Subsequently, the Ring Measure was assessed a second time in a slightly transformed way. Now the decision strategy was manipulated: half of the participants were instructed to make this decision deliberately and the other half had to decide spontaneously. The spontaneous subjects read on each page "Please decide quickly and according to your gut feeling". The deliberate decision makers read: "Please think thoroughly about your decision" underneath the options. A third group served as a control group; participants were not instructed in any specific way, they were just told to make an additional 32 decisions.

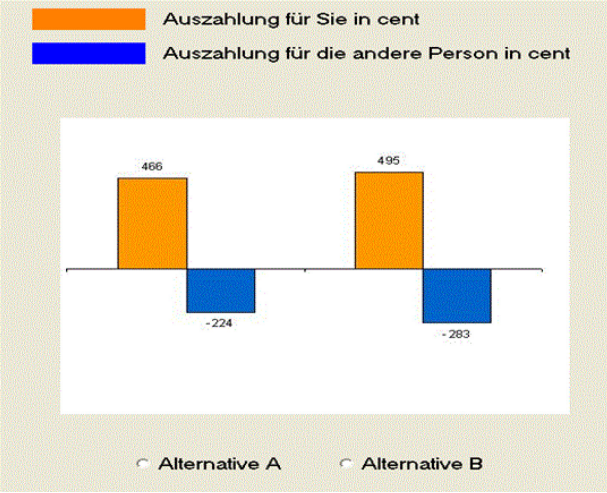


Figure 3.1: Example for a choice in the Ring Measure of Social Values.

Following the second Ring Measure of Social Values, subjects were asked to indicate on a scroll bar how intuitive (0) or deliberate (100) they had made their choices. This served as a manipulation check as well as the recorded decision times. Reaction times have been proven to be a reliable means for the measurement of cognitive processes (Rubinstein, 2007).

Finally, participants were administered the Preference for Intuition and Deliberation scale (Betsch, 2004; 2007). Afterwards, participants were thanked, debriefed, paid and dismissed.

Payment was calculated individually for each subject by adding the number of points that a subject had collected for "self" in each of the two Ring Measures plus the number of points the subject's partner had collected for "other" in both rounds. Number of points were paid in Euro exactly as displayed to subjects but discounted by the factor 1/100. Subjects received an endowment of 1000 points in order to cover them from potential losses caused by an extremely pro-self partner. The average payoff was 3.49€ (SD = 1.08€) and the experiment lasted about 30 minutes in total.

3.3 Results

Sample

In reference to previous practice (Smeesters et al., 2003), we excluded thirty-eight participants from the analysis because the length of their vector was below a consistency of > 60% in one of the two Ring Measures. Of the remaining 130 students, 62 had participated in the deliberate group, 58 had participated in the intuitive group

and 10 had participated in the control group. According to the first round of the Ring Measure, 56.7% of all participants were classified as individualistic, 22.5% as cooperative, 9.2% as competitive, 9.2% as aggressive and 2.5% as altruistic.

Manipulation Checks

In order to make sure that the transformation of the second Ring Measure did not cause significantly different outcomes in the value orientations, there was a control group (n= 10) which did not receive any specific instruction before completing the second Ring Measure. In this group, no significant differences were found for the social value orientation, the sum for self, the sum for other or consistency between the two Ring Measures (all Fs <1, for correlations between round 1 and round 2 see Table 3.1). Thus, any differences in the results of the two Ring Measures are due to the manipulation of the decision styles.

Table 3.1: Correlation coefficients between round 1 and round 2 in the control group.

	self 1 x self 2	other 1 x other 2	angle 1 x angle 2	consistency 1 x consistency 2
r =	.525	.883**	.991**	.166

*Note: ** p < .01, * p < .05*

The effectiveness of the intuitive and deliberate instructions was confirmed by the manipulation checks. A one-way between subjects ANOVA with reported decision style as the dependent variable (running from 0 at the very left end for intuitive to 100 at the very right end for deliberate on a scroll bar) revealed significant differences between the two groups (F (1, 116) = 112.232, p = .000, Cohen's d= .492, for descriptive data see Table 3.2). As expected, intuitively instructed participants indicated significantly lower numbers than deliberately instructed participants. There were no effects of gender with regard to this finding. Another one-way between subjects ANOVA with reaction time of the second Ring Measure as the dependent variable showed that, in line with our expectation, reaction times of deliberate subjects were significantly longer than of intuitive subjects (F (1, 116)= 83.232, p < .000, Cohen's d= .418, for means and standard deviations see Table 3.2). Again, no differences for gender were found. Thus, the instruction to decide deliberately led to increased cognitive processing resulting in a

longer response time, whereas the instruction to decide intuitively induced faster decisions.

Table 3.2: Means and standard deviations (in parentheses) for reported decision style and reaction time in round 2.

	intuitive	Deliberate
reported decision style	27.397 (21.391)	73.500 (20.535)
reaction time 2	2.557 (.935)	6.918 (3.214)

3.3.1 Stability of Social Value Orientation

According to our hypothesis, we expected an influence of the decision style on the stability of the value orientation. Subjects who made deliberate decisions in the second Ring Measure should convey less stability of their social value orientation than intuitive participants. In operational terms, the absolute difference between the social value orientation (calculated as an angle) measured in the first Ring Measure and that measured in the second Ring Measure was expected to be larger for subjects in the deliberate than in the intuitive condition. We calculated the difference between the two angles in terms of absolute numbers, because we wanted to make sure that positive and negative variations did not cancel each other out[9]. We ran a one-way ANOVA with decision style and gender as independent variables. The dependent variable was the absolute difference between the angle that was calculated for the SVO in round one and round two. According to this analysis, there was no significant difference between the two groups and no significant effect of gender (all $Fs < 1$).

Figure 3.2 suggests that the structure of the data might be the cause for this finding. As the graphical depiction of females and males clearly shows, there is an exceptionally large variance for male subjects; for female participants, the variance is by far smaller and there is a difference in the stability of the SVO between the two decision styles. To check whether this is true and whether the interaction effect between the decision style and gender perhaps did not become significant in the ANOVA due to the large variance

[9] We do not report results in terms of categories of SVOs since the borders of the classifications are somewhat arbitrary. Also, a change between categories can easily happen even when changes in SVO are only small, e.g. if a person has a SVO that is close to the border of the adjacent category. On the other hand, sometimes even large changes in SVO do not elicit changes in the category, if the person simply switched from one end of the category to the other. Therefore, we measure the change in the angle of the SVO, as this is more precise.

in the distribution of the male dataset, we ran the same ANOVA again separately for men and women. Our result confirms this suspicion. For female participants, we did indeed find that the absolute difference of the angles between the two measurements is significantly larger for the deliberate group than for the intuitive group (F (1, 83) = 6.330, p = .014, Cohen's d= .071). Thus, for females our hypothesis that deliberate choices decreased the stability of the SVOs as compared to intuitive choices was confirmed. For male participants, on the other hand, there was no such effect (F < 1).

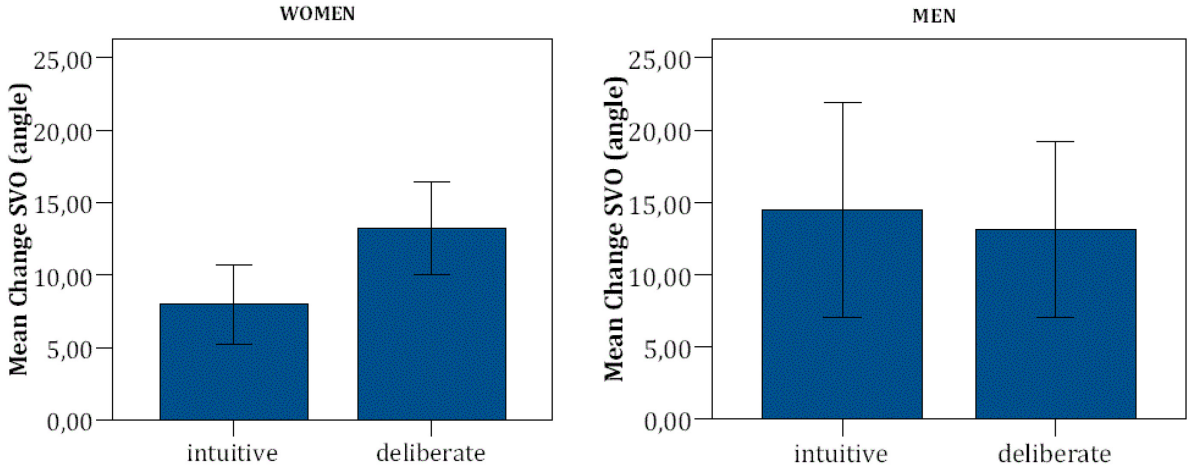


Figure 3.2: Mean changes in SVO between round 1 and round 2, calculated as the difference between the two angles. Error bars indicate 95% confidence intervals.

3.3.2 Consistency of the Social Value Orientation

The length of the vector in the Ring Measure of Social Values serves as a measure for the consistency of a social value orientation. Since deliberation leads to an increased awareness of one's decisions, we expected that choices made deliberately would lead to a more coherent pattern, i.e. choices should be more similar to each other. Thus, we hypothesized a higher increase in consistency between the two rounds for the deliberate (compared to the intuitive) group. Figure 3.3 displays the results. As again the distribution in the male data points shows a large variance, possibly obscuring results, we analyzed male and female subjects separately. We ran a mixed-model ANOVA with decision style as the between subject factor, round (first vs. second) as the within subject factor and consistency as the dependent variable. The analysis for males revealed that there was no main effect for the decision style (F < 1). However, there was a significant main effect for the number of rounds (F (1, 32) = 6.189, p = .018, Cohen's d= .162). This effect shows that consistency was larger in the second Ring Measure than in the first one. We did not find any interaction effect between the decision style and the

number of rounds (F < 1). For females, the main effect of the decision style and of the number of rounds was also not significant (all Fs < 1). Nevertheless, we found a marginally significant interaction effect between the number of rounds and the decision style in the predicted direction (F (1, 84) = 3.416, *p* = .068, Cohen's d= .039). As hypothesized, the consistency of the SVO of deliberately instructed subjects was larger in the second Ring Measure than in the first, whereas the consistency of intuitively instructed subjects even became smaller in the second round.

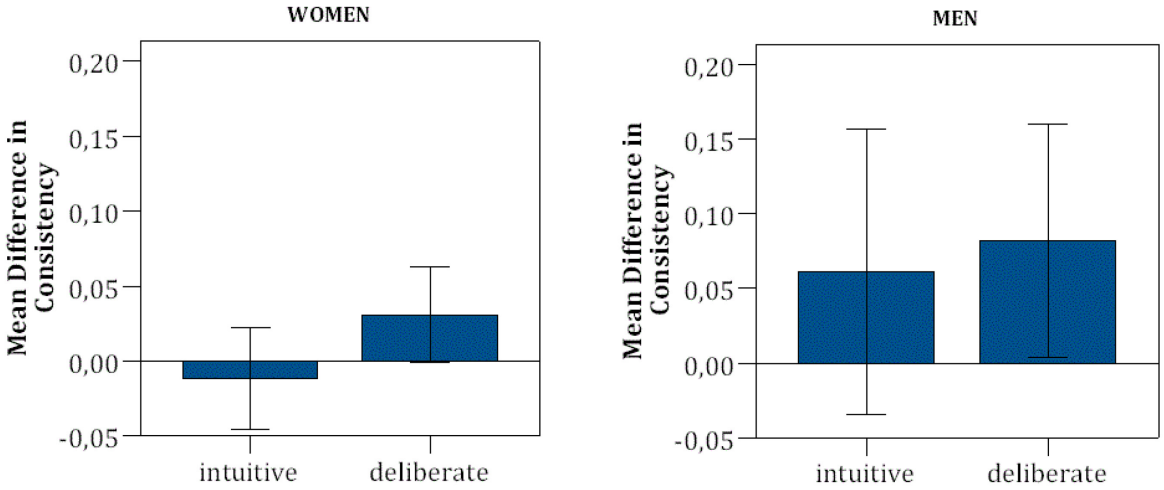


Figure 3.3: Differences in SVO consistency from round 1 to round 2. Error bars indicate 95% confidence intervals.

3.3.3 Source of the Change in Stability

As shown in the previous section, SVOs of (female) subjects who made their choices deliberately in the second Ring Measure were less stable, i.e. changed more from one measurement to the other than if the choices had been made intuitively. Next, we analyze whether this change was due to an increase in the amounts of points chosen for the self or in an increase in the amount of points dedicated to the partner. Since there is no hint in the existing literature whether deliberation leads to more pro-social or pro-selfish behavior, this analysis was exploratory.

First, we look at the amounts of points taken for self (see Figure 3.4). A mixed-model ANOVA with the decision style as the between subjects factor, round as the within subjects factor and the amounts taken for the self as the dependent variable showed that there was no significant main effect of the decision style (F < 1) and no interaction effect between the decision style and the number of rounds (F < 1). The instruction to decide

deliberately did not induce subjects to take more for themselves from round one to round two than the instruction to decide intuitively. However, there was a significant main effect of gender, revealing that the sum for self was significantly smaller for men than for women (F (1, 116) = 4.731, p = .032, Cohen's d= .039). Thus, men took significantly less for themselves than women.

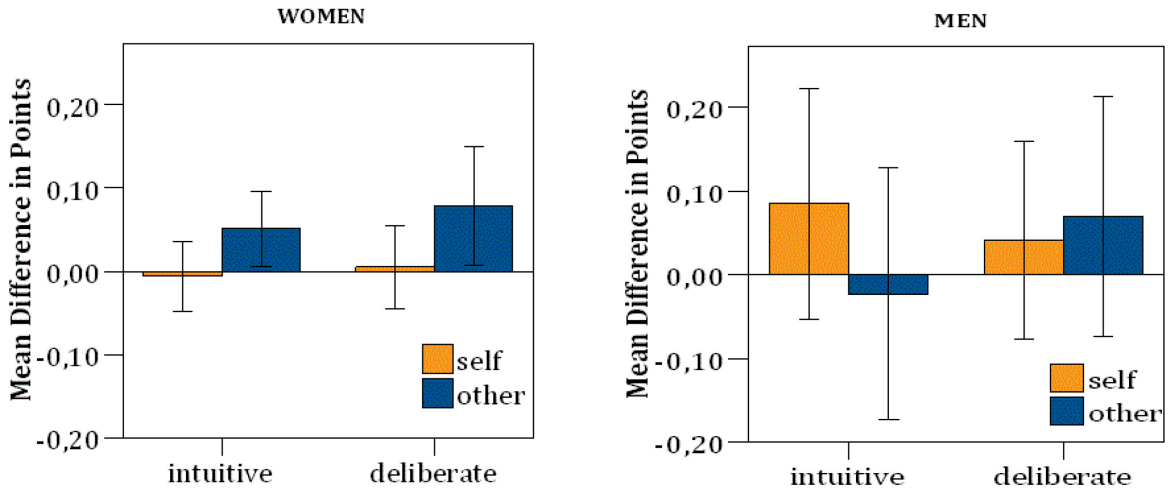


Figure 3.4: Differences between round 1 and round 2 for the amounts chosen for the self and chosen for the partner. Error bars indicate 95% confidence intervals.

Next, we look at the amounts of points given to the partner (see Figure 3.4). A mixed-model ANOVA with the amounts taken for the partner as the dependent variable revealed again that there was no main effect of the decision style (F < 1) and no interaction effect between the decision style and the number of rounds (F < 1; F (116) = 1.724, p = .192, Cohen's d= .015). The way decisions were made did not affect the concern for the partner. Nevertheless, as for the amount of points dedicated to the self, we found a significant main effect of gender (F (1, 116) = 7.261, p = .008, Cohen's d= .059). Male subjects chose significantly more points for their partners than female subjects. Further, there was a significant interaction effect between decision style and gender (F (1, 116) = 5.541, p = .020, Cohen's d= .046). In the deliberate condition, both females and males increased the amounts for their partners. In the intuitive condition, however, women increased the amounts of points they gave to their partner, whereas men gave less.

3.3.4 Differences in Preferences for Deliberation and Intuition

We checked whether the manipulation of the decision style affected the results by activating or inhibiting subjects' inherent preference for deliberation or intuition as

assessed with the PID (C. Betsch, 2004; 2007). The inherent preferred strategy did not interact with or have a main effect on the stability or the consistency of the SVOs nor on the sums for the self and the partner (all $F < 1$).

3.4 Discussion

The purpose of this study was to analyze the extent to which the results of the Ring Measure of Social Values can be influenced by differences in decision styles. Our results are mixed. First, in line with our hypothesis, the stability of SVOs is lower when the decisions that the assessment of the SVO is based upon are made deliberately as compared to intuitively. Deliberation seems to cause people to take more information into account and to consider more facts when making a decision. This might change the hierarchy of personal aims and preferences and results in a higher variability of deliberately made choices than intuitively made choices (C. Betsch et al., 2004). However, this finding only holds true for female subjects. The different decision styles did not lead to significantly different stabilities of male participants' SVOs. This effect was unexpected, because in the literature on intuitive vs. deliberate decision making there is no evidence that males are less susceptible to influences of decision styles than females.

Second, a similar result was found with regard to the consistency of SVOs. Our hypothesis that deliberate choices would lead to a higher consistency within the decisions of the second Ring Measure than intuitively made choices was only supported for female participants. Male participants, on the contrary, made more consistent choices in the second assessment independent of the applied decision style. To the best of our knowledge, there is no scientific proof in the literature that consistency of choices made by males is in general higher than consistency of choices made by females. However, at least for females our result shows that the manner in which the 32 choices are made can have an impact on their consistency. This is important, since the consistency is critical for deciding which participants should be excluded from the analysis.

The third result concerns the way the points for self and other were distributed. Again, gender differences were found. Males kept smaller amounts for themselves than females. We did not expect this result because neither previous studies on gender effects nor on the Ring Measure revealed that women generally act more selfishly than men.

The expected effect, that the applied decision style would affect the amounts kept for the self, was not significant.

Regarding the points given to the partner, there was a significant main effect of gender, showing that male subjects dedicate more to their partners than female subjects. Although this effect is unexpected, since such differences were also not reported in former research on the Ring Measure, it is in line with experimental results by Andreoni and Vesterlund (2001). They found that men are kinder than women if it does not cost them much, as was the case in our experiment, as the choices were arranged such that points dedicated to the partner did not necessarily decrease the amount of points for the self. On the other hand, the few studies that report differences between sexes in other regarding behavior generally show effects in the opposite direction. Research on pro-social behavior in dictator games, for example, has shown that females are more altruistic and donate more to their partners than males (Eckel & Grossman, 1998; Kamas et al., 2008). Our data only support this result with respect to the intuitive group, as can be seen from the significant interaction effect between the decision style and gender. While on average all subjects in the deliberate group gave more to their partners in the second round, in the intuitive group females gave more whereas men gave less. The fact that men in the intuitive group are the only ones who actually decrease the amounts for their partners contradicts the findings by Weimann et al. (2007). According to Weimann et al., subjects generally become selfish if they repeatedly make decisions, because they feel that they fulfilled their duty to take care of the partner's well-being if they had acted selflessly once (even if they know that they will be matched with a different person during the next round). Thus, in our setting, for every subject the sum for the other should have become smaller from round one to round two. We did not find any support for this assumption.

A limitation of our study is that cell sizes of the deliberate and the intuitive group were different for females and males. The number of male and female subjects was not balanced in the deliberate and the intuitive group as we did not expect an interaction between decision style and gender. The fact that we found significant gender effects should be considered in future research.

3.5 Conclusion

Our results have implications for the way SVOs are assessed. To date, SVOs are merely surveyed along with other tasks. Typically, very little attention is paid to the way the measurement is conducted and how participants are instructed to make their decisions. Our results indicate that the assessment of SVOs should be done very carefully and researchers should make sure that subjects use the same decision style in order to ensure the comparability of results. If subjects are rushed into the Ring Measure at the end of an experiment and asked to "quickly fill out one more questionnaire", choices are likely to be made intuitively, which could at least affect the results for females. Further research on this topic should be done to assess why the decision style did not affect males' SVOs and whether this is a general finding or just a specificity of our sample.

Appendix

Instructions

Thank you for participating in this study. You participate in a decision task for two persons.

You are one of the two persons. One of the other persons being in this room will be randomly chosen to be your partner.

You choose several times between the two alternatives A and B. The other person will do the same task.

You will not be told who the other person is and the other person will not be told who you are. You will not be able to see the decisions made by the other person. The other person will also not be able to see the decisions made by you.

Your payoff will be calculated according to your own decisions as well as to the decisions of your partner.

4 Increasing the Willingness to Cooperate in Social Dilemmas - The Role of Feedback in the Presence of Informational Uncertainty [10]

> *Then if anyone at all is to have the privilege of lying, the rulers of the State should be the persons; and they, in their dealings either with enemies or with their own citizens, may be allowed to lie for the public good.*
>
> Plato, The Republic

4.1 Introduction

The provision of feedback is common practice both in the public as well as in the private sector. Politicians do not become tired of emphasizing what they have achieved and how well for example the economy and the labor market are developing. Managers report statistics with key performance indicators that prove how successful their departments and companies are. Hearing all this- as stimulating and mood-elevating as it sounds- who did not sometimes notice the shadow of a doubt that the provided information is the whole truth and that the picture that is painted might not be too optimistic?

Related literature shows that the issue of false or imperfect information provision has intensely been studied by economists. The major part of existing research focuses on two aspects. The first is whether people provide false or imperfect information in order to increase their individual profit and how their partners react to that behavior. The second aspect deals with the question whether people provide false or imperfect information to increase collective profit.

Results of experimental research show that people indeed provide false and imperfect information in order to increase their individual profit. In dictator games,

[10] Based on: "Effects of informational uncertainty on cooperation in social dilemmas" by Mareike K. Hoffmann, Thomas Lauer & Bettina Rockenbach (2010), Working Paper, University of Erfurt.

subjects announce that a split was determined by chance instead of admitting that they actively chose a split that favored themselves (Ackert et al., 2007). In ultimatum games, proposers cheat about the size of the pie and responders cheat about their outside option when given the chance to do so (Croson et al., 2003). Concerning the consequences in the short run, responder threats and lies increase the size of offers made, while proposer lies decrease them. In the long run, after the revelation of false information, proposers' lies both increase offers and decrease acceptances. Responder revealed lies lead to smaller, but not significantly smaller offers. Besides also finding support for people's propensity to lie in order to increase individual profit, Gneezy (2005) argues that people are sensitive to their gain when making the decision to lie. According to Gneezy, people care less for a lie the bigger their personal gain from that lie is. Further, they do not only care how much they gain from that lie but also how much their partner will lose. Hurkens et al. (2009) reinterpret Gneezy's results claiming that people belong to one of two types. They either never lie or they lie as long as the outcome obtained by lying is preferred to the outcome obtained by telling the truth. According to their reasoning, in the latter case people will always lie and the decision to do so is not influenced by considerations about relative changes of the outcome for the partner.

With regard to the aspect of provision of false information to increase the collective profit, there is evidence that leaders in public goods provide false information about the MPCR in order to induce cooperation and gain efficient payoffs (Serra-Garcia et al., 2008). Serra-Garcia et al. further show that the number of leaders' lies significantly drops as soon as there is the opportunity to send vague messages instead of providing outright lies.

Despite findings like these, to the best of our knowledge, there is hardly any research on the question how people react to the revelation of having received false information that served to increase collective profit. We set out to answer this question by investigating contribution behavior in a public-good game with different feedback conditions. First, we replicate previous findings which show that uncertainty decreases cooperation (Au et al., 1998; Wit & Wilke, 1998). Second we analyze how contribution behavior is influenced by feedback about partners' contributions that is either exaggerated in absolute or in relative terms given it is common knowledge that the feedback might deviate from actual contributions. Third, we analyze how the revelation

that the feedback was exaggerated and will continue to be so affects future contribution behavior.

4.2 Method

Experimental Design

The experiment was designed as a public-good game. Subjects were assigned to groups of four and randomly distributed to the baseline treatment with perfect feedback (*PF*) and the test treatments with imperfect feedback (*IF*). Each treatment was conducted with twelve groups and therefore provides twelve independent observations. The experiment was run at the eLab of the University of Erfurt. 192 subjects were recruited using the Orsee (Greiner, 2004) system. Subjects were placed in separate compartments and interacted anonymously via the computer interface with members from their group. There was no verbal communication during the whole experiment. The experiment was programmed and conducted with the software z-Tree (Fischbacher, 2007). Subjects were paid privately after the end of the experimental session with an exchange rate of 1€, for each 80 tokens. A session lasted approximately 70 minutes and average earnings were 11.75€.

Procedure

The experiment was made up of two phases, each consisting of 20 identical rounds. Prior to the first period subjects only received instructions for phase 1 and were informed that there will be a second phase and that payoffs and decisions will be independent in the two phases. Each subject received an endowment of 20 tokens (E) per round. At the beginning of every round subjects had to name their belief about the other group members' next average contribution decision. After that they made a decision about how many tokens to contribute (c_i) to the public good. Tokens contributed were deducted from a player's private account, multiplied by 1.6 and evenly distributed among all four members (N) of a group. Tokens kept remained in player's private account. Equation (1) summarizes the individual payoff-function and emphasizes that every contributed token yields 0.4 token for the player notwithstanding whether it was contributed by himself or any other group member. This also means that every token contributed by the player generates a value of 0.4 for the three other group members, whereas every kept token has a value of 1 for the player.

$$(1) \quad P_i = (E - c_i) + 1.6\, C/N \quad \text{with} \quad C = \sum_{j=1}^{4} c_j$$

Treatments

After all members of a group had made their decisions, subjects were informed about the average contribution of the other group members in every round. This feedback varied by treatment (for an overview see Table 4.1).

Table 4.1: Feedback mechanisms by treatment.

Player	Contribution	Feedback *PF*	Feedback *IF0*	Feedback *IF25*	Feedback *IF no sucker*
1	c_1	$(c_2+c_3+c_4)/3$	$(c_2+c_3+c_4)/3$	$(c_2+c_3+c_4)*1.25/3$	$\max(c_1;(c_2+c_3+c_4)*1.25/3)$
2	c_2	$(c_1+c_3+c_4)/3$	$(c_1+c_3+c_4)/3$	$(c_1+c_3+c_4)*1.25/3$	$\max(c_2;(c_1+c_3+c_4)*1.25/3)$
3	c_3	$(c_1+c_2+c_4)/3$	$(c_1+c_2+c_4)/3$	$(c_1+c_2+c_4)*1.25/3$	$\max(c_3;(c_1+c_2+c_4)*1.25/3)$
4	c_4	$(c_1+c_2+c_3)/3$	$(c_1+c_2+c_3)/3$	$(c_1+c_2+c_3)*1.25/3$	$\max(c_4;(c_1+c_2+c_3)*1.25/3)$

In the *PF* treatment the feedback always displayed actual contributions. The mere effect of uncertainty about the correctness of the feedback on contribution behavior was analyzed in treatment *IF0*. Here, subjects were informed that the feedback might deviate from actual values while in fact the displayed feedback always corresponded to actual contributions, i.e. was not exaggerated[11]. In treatment *IF25* the feedback overestimated the other group members' contributions uniformly by about 25% based on the average inputs of the remaining group members. More precisely the feedback was calculated as the sum of others' contributions multiplied by 1.25 and divided by 3. To avoid unrealistic information the maximum feedback was limited to 20 (the endowment) and the exaggerated sum was rounded to be a credible quotient of a division by three. Since our main purpose was to analyze whether the announcement of higher values fosters cooperation and to avoid very small and hardly effective exaggerations, we implemented a minimum feedback of five. At the end of phase one of every treatment, subjects saw a summary of the first phase that provided information about their own average

[11] The original sentence from the instructions was: "From the beginning of the second period you will be informed about the average contribution of the other three members of your group in the previous period at the beginning of each period. Please note that this information might deviate from the true contribution!"

contributions, the average exaggerated feedback if relevant and the actual average contributions of the other three group members[12].

After seeing the summary, all the subjects in *IF0* and *IF25* were asked to rate the received feedback with regard to moral and monetary aspects. The first question was "How do you evaluate the deviation between the presented and the actual feedback information from a moral point of view?" The second question was "How do you evaluate the deviation between the presented and the actual feedback information with respect to your own monetary payoff?" Both questions were answered on a seven point scale from negative (-3) to positive (3). At the beginning of phase 2 there was another short introduction read out to the subjects to inform them that the second part of the experiment will be identical to phase 1 and that they are member of the same group again. In other words in phase 2 subjects in the *IF0* treatment now knew that the feedback they received was correct and subjects in the *IF25* treatment knew that the feedback was systematically overestimated by about 25% and that the overestimation would continue in phase 2. Table 4.2 summarizes the different treatments.

Table 4.2: Treatment summary.

Treatment	Feedback (un) certainty	Exaggeration
PF	Perfect feedback	displayed value = actual value
IF0	Imperfect feedback: "might deviate"	displayed value = actual value
IF25	Imperfect feedback: "might deviate"	displayed value = 1.25 x actual value

4.3 Predictions and Equilibria

In this section we first discuss the predictions given by standard theory of rational selfish decision makers and the influence of inequality and risk aversion as well as uncertainty on subjects' strategies in the game. We then explore the arguments of conditional cooperation towards our research questions stated above and finally specify some predictions to render our questions more precisely.

Equilibria

In a one-stage public-good game without any sanctioning mechanism the rational selfish player will contribute nothing independent of what she beliefs about the other

[12] For an example screenshot see Appendix A.

group members' input. Therefore the Nash-equilibrium will be no cooperation at all. This is also true for every single stage of finitely repeated game (Friedman, 1986).

However, experimental research reveals that only a limited number of players in public-good games behave this way especially if the game is repeated for a known number of rounds. Laboratory public goods experiments typically show that subjects contribute roughly one half of their endowment in first rounds and start to decrease their input over time until there is nearly no cooperation at the end of the game (Ledyard, 1995; Chaudhuri, 2006). One prominent explanation for this pattern is the approach of conditionally cooperative behavior (Fischbacher & Gächter, 2001). According to this approach, people are willing to contribute as long as they believe (or observe) that other group members will do the same and as long as the feedback - used to update these beliefs - provides no reason to expect lower contributions in the future. This behavior is commonly referred to as conditional cooperation. In a recent study Fischbacher & Gächter (2010) provide empirical evidence that exposes conditional behavior as imperfect because subjects are selfishly biased, i.e. they prefer to contribute a little less than the other group members. This seems to be one major reason for declining contributions.

Another explanation for the adaption of subjects' behavior towards others' contributions derives from the models of inequity aversion presented by Fehr & Schmidt (1999) and Bolton & Ockenfels (2000). Both models claim that behavior is not only driven by a subject's own monetary outcome but also by the relative outcome (Bolton, 2000) and the non-monetary utility created or destroyed by payoff differences (Fehr, 1999). Subjects evaluate their payoffs in comparison to their partners' earnings and try to reduce inequity. Despite the fact that the models of inequity aversion focus on the players' payoff distribution rather than on their beliefs, these comparisons lead to similar contribution patterns in public-good games as predicted by conditional cooperation.

A further approach was put forward by Kreps et al. (1982). This model predicts at least temporarily cooperation in repeated games even if there are no individual social preferences. The main assumption is some sort incomplete information about the other players strategies either in the way that at least one group member plays tit-for-tat or that some others might have additional utility from acting altruistic. It is not necessary that these 'irrational players' actually participate as long as subjects belief in their

existence. Under these conditions cooperative strategies might emerge even among absolutely selfish players.

Further, there is experimental evidence that uncertainty reduces cooperative behavior in public-goods games. Wit & Wilke (1998) demonstrate that environmental uncertainty about the provision point of a public-good has detrimental effects on cooperation if subjects also face social uncertainty, i.e. uncertainty about their partners' cooperative behavior. Au et al. (1998) show that a greater uncertainty about the outcome of a public good decreases cooperation if subjects perceive that their contribution is critical for the outcome of the public-good. A recent study by Brennan et al. (Brennan et al., 2008) also reveals a negative relation between contributions and risk level in a public-good game. The authors find that risk concerns are self-centered. More precisely, they report that contributions decrease if people perceive personal risk but are not significantly affected by risks that other people bear.

Predictions

Due to our intention to exaggerate the feedback in two treatments we had to inform all subjects that the information about the other group members' contribution displayed on their screen might deviate from the actual values. By doing so the instructions obviously created an extra amount of uncertainty that added to the usual inevitable question how the other group members might behave. We first analyze the mere effect of uncertainty, i.e. without exaggeration. The uncertainty in the *IF0* treatment that is caused by the imperfect feedback is similar to the risk subjects face in Brennan's et al. (2008) study insofar as subjects know that they will not be perfectly informed. We expect that subjects account for the higher uncertainty level in the *IF0* treatment than in the *PF* treatment by discounting their contribution decisions by some amount to cover against the possibility that actual contributions of fellow players are smaller than announced by the feedback. Thus we assume that contributions are smaller in the *IF0* treatment than in the *PF* treatment.

Prediction 1: Uncertainty reduces cooperation.

The combination of uncertainty and exaggerated feedback in *IF25* might lead to the two possible outcomes predicted in H2a and H2b. As the available information and thus the uncertainty in phase 1 is the same in *IF0* and in *IF25* , we can again apply the logic of

uncertainty reducing contributions to the public-good (Au et al., 1998; Wik & Wilke, 1998; Brennan et al., 2008). This means that even if the announced feedback is exaggerated, due to the existing uncertainty contributions are likely to be lower in the *IF25* treatment than in the *PF* treatment.

Prediction 2a: Uncertainty reduces cooperation despite exaggerated feedback.

On the other hand, Fischbacher & Gächter's (2010) findings suggest that people are conditionally cooperative and contribute slightly less than what they believe that the other group members will contribute. The feedback mechanism in the *IF25* treatment exaggerates others' actual contributions which in turn might raise beliefs. Research on decision making has shown that under uncertainty people often apply simplifying heuristics which can result in anchoring effects, i.e. assimilations of a numeric estimate to a previously considered standard (e.g., Tversky & Kahnemann, 1974; Galinsky & Mussweiler, 2001). Although our feedback is imperfect it is the only information that the subjects receive and therefore might cause such an anchoring effect with regard to the belief about other players' contributions. If the anchoring effect is stronger than the cooperation-decreasing effect of uncertainty, inputs to the public good should be higher in the *IF25* treatment than in the *PF* treatment.

Prediction 2b: Exaggerated feedback increases cooperation despite uncertainty.

After phase 1, the information structure is the same in *IF25* and *PF*. While subjects in the *PF* treatment know that they can rely on the feedback information, subjects in the *IF25* treatment now know that they need to discount 25% of the feedback in order to calculate their partners' actual contributions. Again applying the argument of conditional cooperation, we expect that subjects adjust their behavior and discount the feedback information. If this is the case, contributions in phase 2 should not differ between the treatments and second phase contributions in *IF25* should be below those of the first 20 rounds.

Prediction 3: ***The effect of exaggerated feedback will vanish once subjects are aware of the exaggeration.***

If subjects understand that the exaggeration mechanism induces more cooperation and at the same time a higher overall payoff, they should evaluate the exaggeration positive from a monetary point of view. However, research provides evidence that people are generally lying-averse (e.g., Brandts & Charness, 2003; Holm & Kawagoe, 2010; Gneezy, 2005). Therefore we expect that despite the monetary advantage the exaggeration will be evaluated negatively from a moral point of view, indicating that the end does not justify the means.

Prediction 4: ***Subjects evaluate the exaggeration positively from a monetary but negatively from a moral point of view.***

4.4 Results and Discussion

The results are presented in two subsections according to the two phases of the experiment. The first one focuses on the contribution behavior and the changes in beliefs about other subjects' contributions under the different feedback conditions (predictions 1 and 2). In the second subsection we focus on the long-run effects of exaggerated feedback und discuss the influence from revelation after phase 1 (predictions 3 and 4).

First we turn to the question whether uncertainty reduces cooperation. Figure 4.1 shows the average contributions during the first phase. In comparison to the control-treatment with perfect feedback the contributions are significantly (p = .068)[13] lower under imperfect feedback conditions (4.9 in *IF0*, 6.5 in *PF*).

[13] All comparisons between two treatments are tested as independent samples with the MWU-Test and 12 independent observations in each treatment.

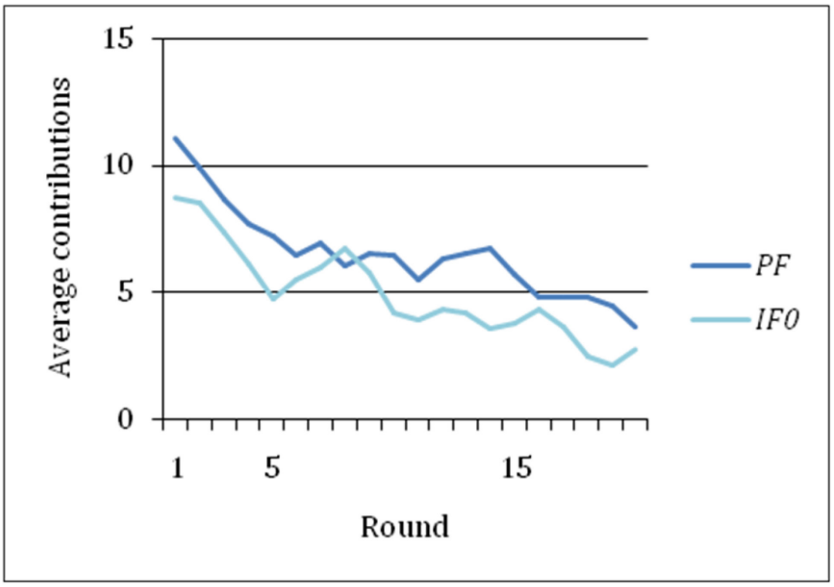


Figure 4.1: Average contributions in phase 1 under perfect feedback (*PF*) and imperfect feedback without exaggeration (*IF0*).

With view to the results presented by Wit & Wilke (1998) this difference confirms the detrimental effect of uncertainty on cooperation in social dilemma situations. Nevertheless, it is important to notice that the uncertainty that we implemented in *IF0* is broader than the uncertainty presented by Wit & Wilke because our feedback mechanism does not differentiate between environmental and social uncertainty.

Result 1: ***Cooperation is lower if subjects face imperfect feedback about the other group members' contributions.***

Next we analyze whether exaggeration is able to increase cooperative behavior in the presence of uncertainty. The second treatment (*IF25*) maintains the uncertainty about the feedback but exaggerates the other players' average contribution uniformly by about 25%. In comparison to the situation with mere uncertainty (*IF0*) this leads to higher cooperation rates or at least to a less considerable downward shift over time.

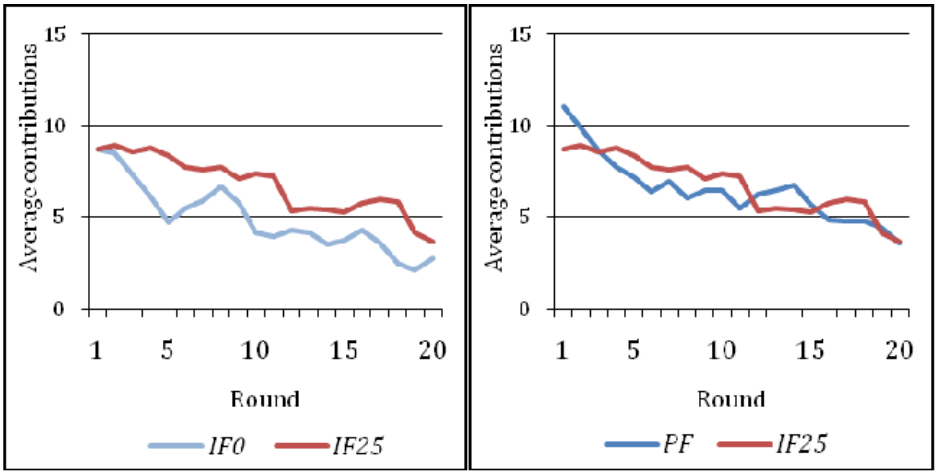


Figure 4.2: Uncertainty and exaggeration.

As can be seen on the left hand side of Figure 4.2, on average subjects who received exaggerated feedback contributed 6.8 token and therewith 1.8 token more than those who participated in the treatment without exaggeration (*IF0*). After the feedback overestimation became effective this difference is significant (round 5 – 20 p = .092). However, compared to our baseline treatment, the exaggeration mechanism is not sufficient to overcome the negative effect of uncertainty. Supporting prediction 2b, subjects' contributions to the public good in *IF25* are not significantly different from contributions under perfect feedback conditions (p = 1!), as shown by the right hand side of Figure 4.2. While the mere uncertainty in the *IF0* treatment reduces contributions by about 24% on average compared to the control treatment *PF*, the exaggeration in *IF25* raises the contributions by about nearly the same scale (26%).

Result 2: ***Feedback that is exaggerated in absolute terms increases cooperation but cannot overcome the negative effect caused by uncertainty.***

To shed some further light on the differences induced by uncertainty and exaggeration Figure 4.3 shows the average variances of contributions in phase 1. Especially in the first 10 rounds both treatments with imperfect feedback show a higher level of variance in contributions than the treatment with perfect feedback.

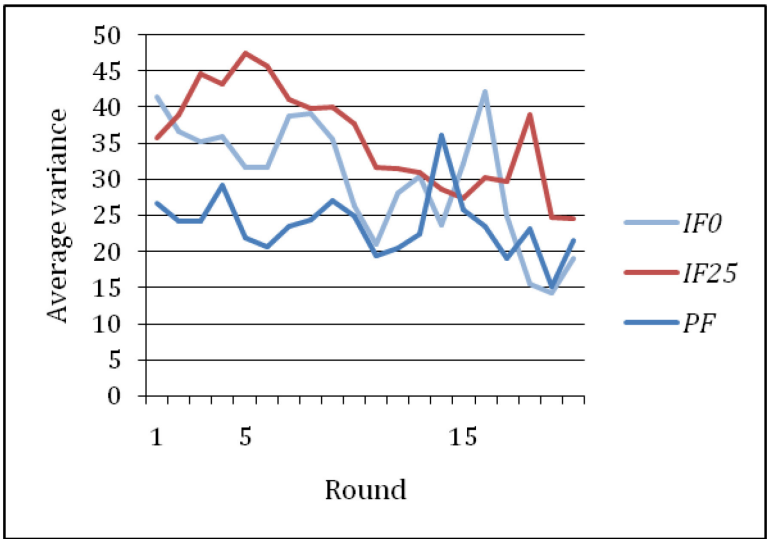


Figure 4.3: Average variances in contributions in phase 1.

The contribution variance in *IF0* is 36.6 and even 41.4 in *IF25* while it is only 26.7 in the *PF* treatment. Levene's test rejects ($p < .001$) the hypothesis of equal variances under perfect and imperfect feedback conditions. The information that feedback might deviate from actual values does not only lower contributions on average but also increases the scattering of contribution decisions no matter whether there actually is an exaggeration or not.

The next section deals with the long-run effects and subjects' evaluation of the exaggeration. After revealing the exaggeration mechanism and the actual contributions at the end of phase 1 subjects were informed that neither their group nor the feedback conditions would be changed during the second phase. Although there is no informational difference between the *PF* and the *IF25* treatment (and also not between the *IF0* treatment) in phase two because there is no uncertainty in any of the treatments since subjects now know how to calculate the actual average contribution of the other group members, contributions are different (see Figure 4.4).

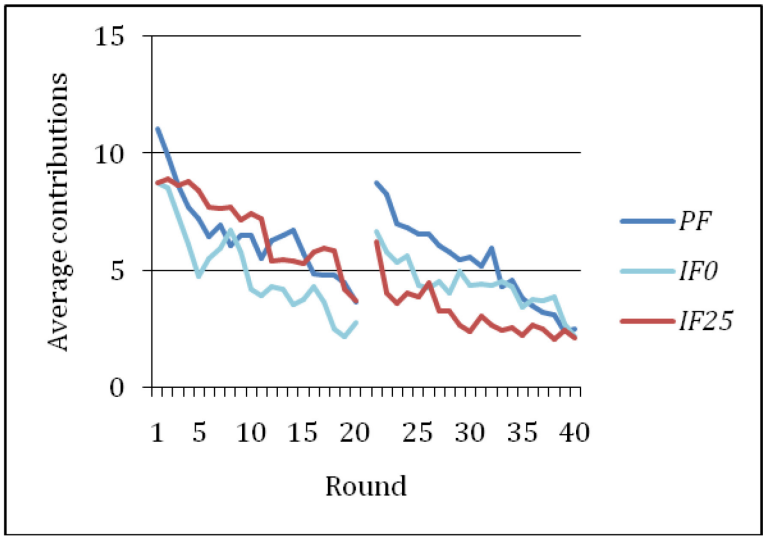


Figure 4.4: Average contributions in phase 1 and 2.

In phase 2, subjects in the *IF25* treatment contributed significantly less than subjects in *PF* ($p = .033$). The decline of cooperation between phase one and phase two is significant in all three treatments ($p < .001$ in *IF25*, $p < .001$ in *IF0* and $p = .040$ in *PF*)[14]. The fact that contributions in phase 2 are lower in the *IF25* treatment than in the *PF* treatment although the decline from phase 1 to phase 2 was significant in both treatments and although contributions did not differ in phase 1 reflects the strong negative effect that the revelation of the exaggeration mechanism had on subjects' contribution behavior.

The morally questionable act of overestimating contributions might have lowered subjects' perceived sense of obligation to contribute and seems to have encouraged them to maximize their individual instead of the collective benefit. This assumption is supported by the result of the evaluation of the exaggerated feedback displayed in result 4. The finding is also in line with the results presented by Wilson and Kelling (1982) that became known as the "broken window theory" and go back to an experiment conducted by the psychologist Zimbardo in 1973. Zimbardo abandoned one car without license plates and with the front lid open in the Bronx and another identical car in Palo Alto. The car in the Bronx was completely destroyed within about a day while the one in Palo Alto remained untouched for a week. However, after breaking one of the windows, the car in Palo Alto was also completely desolated only within a few hours (Zimbardo, 1973). Thus, criminal activity substantially increased even in this otherwise quiet

[14] All comparisons within one treatment are tested as related samples with the Wilcoxon-Test and 12 independent observations.

neighborhood as soon as there were cues that enhanced this behavior. Likewise, the act of providing exaggerated feedback information might have triggered subjects to engage in less moral, i.e. less collectively beneficial behavior in the second phase.

Result 3: ***Revealing the difference between the displayed and the actual feedback has a devastating effect on contributions in the second phase.***

Moral evaluations of the exaggerated feedback are not significantly different from monetary evaluations in *IF25* (p = .941) after phase 1 (see Figure 4.5). The size of the bubbles in Figure 4.5 illustrates subjects' moral and monetary judgments. Although the correlation between the two evaluations is not significant (r = .168, p = .255), the exaggeration mechanism is negatively evaluated from both points of view by about 40% of subjects. Obviously, the exaggeration mechanism was not appreciated as a means that is justified by the end because it serves to increase contributions and collective benefit.

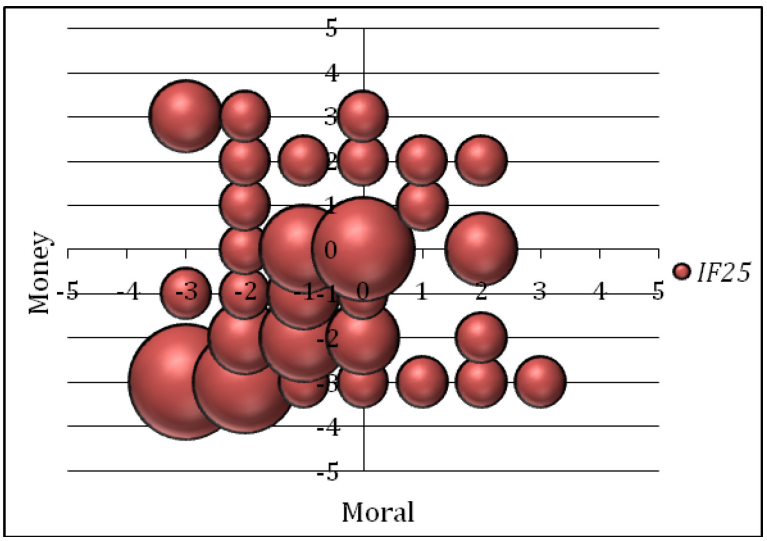


Figure 4.5: Frequency of judgment decisions under imperfect feedback conditions with exaggeration (*IF25*).

Result 4: ***After the revelation subjects evaluate the exaggerated feedback bad from a monetary and from a moral perspective.***

Further Results: Beliefs

A surprising difference between the treatments can be found if the beliefs that subjects stated about the others' average contribution before they announced their own contribution decision is taken into account. The left side of Figure 4.6 shows the average contribution, belief and feedback values in phase 1 under perfect feedback. It can be seen that there are no noteworthy differences. Under imperfect feedback conditions, when subjects know that the displayed feedback might not represent actual values, one might expect a visible deviation of beliefs from the feedback that was received. Contrary to this expectation the right side of Figure 4.6 shows that there is a close connection between the presented feedback and beliefs. However, subjects systematically discount (Wilcoxon, $p < .001$)[15] their own contributions from the input they expect from their group members.

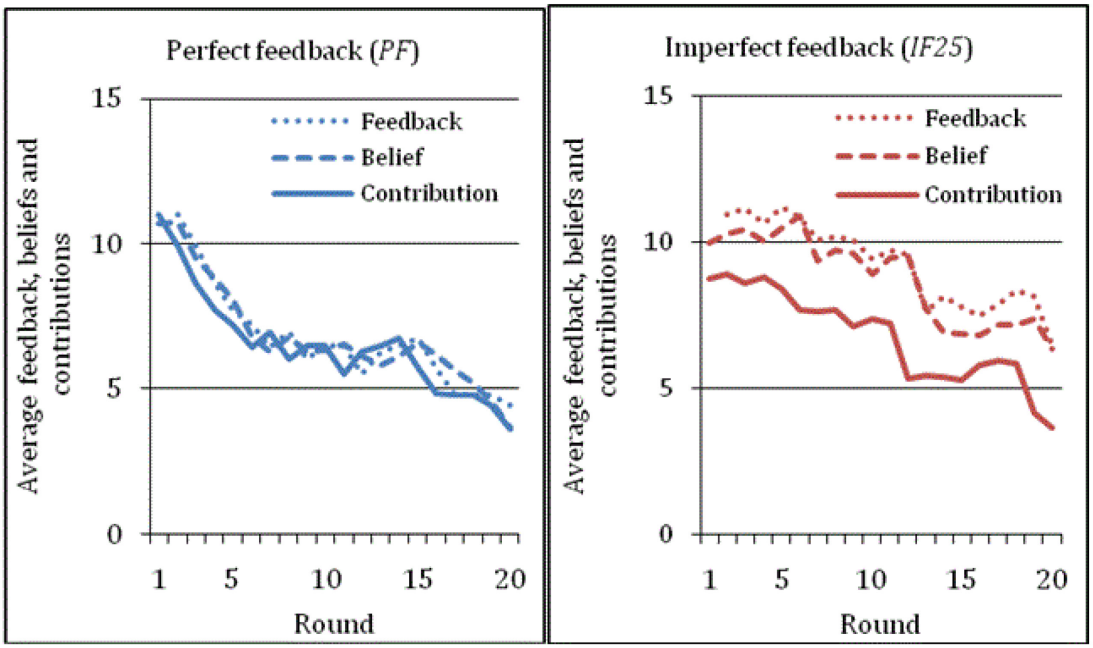


Figure 4.6: Difference between belief and contribution conditions under perfect and imperfect feedback in phase 1.

It seems that this discount is driven by the uncertainty and therefore should decline in the second phase. As Figure 4.7 shows, the removal of feedback uncertainty indeed reduces the gap between beliefs and contribution ($p = .073$). In the second phase subjects know how the exaggeration mechanism works and do not need to subtract an

[15] The discount from belief to contribution is also significant in the *IF0* treatment (Wilcoxon-Test: $p < .001$) and the differences are significantly higher in those treatments with imperfect feedback than with perfect feedback. (MWU-Test: *PF*/*IF0* $p < .05$ and *PF*/*IF25* $p < .001$).

amount from their beliefs in order to cover against the uncertainty that the feedback might deviate from actual values anymore. While the average distance between feedback and contribution remains unchanged due to the exaggeration mechanism, the average belief moves away from the presented feedback and towards contributions.

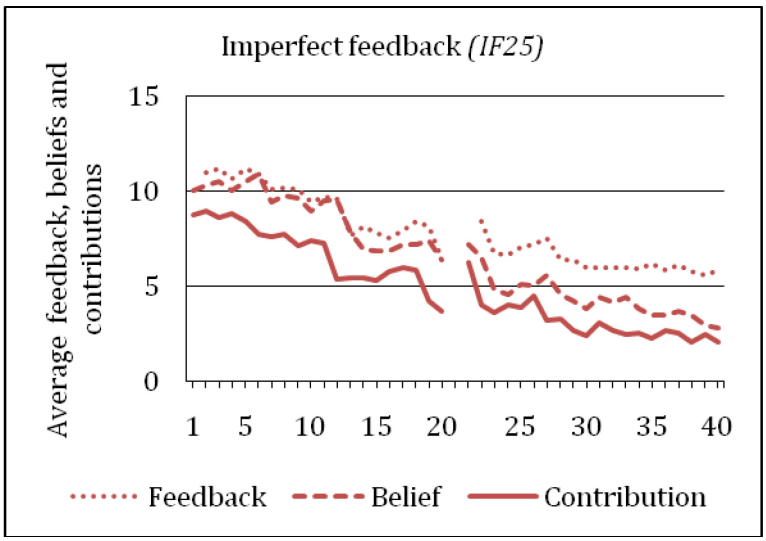


Figure 4.7: Difference between belief and contribution under imperfect feedback in phase 1 and 2.

One might argue that not the absence of uncertainty but the ability to calculate the actual average contribution reduces the distance between beliefs and contribution in the second phase. This is doubtful for two reasons. The first one is that the treatment with mere uncertainty (*IF0*) also shows a significant distance between beliefs and contributions ($p < .001$) in phase 1, which declines just like in the *IF25* treatment once the uncertainty is removed in the second phase ($p = .052$). The second reason can be found in the exaggeration treatment (*IF25*) itself. Although subjects can easily calculate actual values by subtracting 25%, the average beliefs are significantly above that calculated value ($p < .001$). Since this is not the case under perfect feedback conditions (*PF*) the differences in the *IF* treatments seem to be a result of some remaining uncertainty rather than a result of imperfect conditional cooperation (Fischbacher & Gächter, 2010).

So far our results show that the exaggeration of group members' contributions fosters cooperative behavior. However, we also found that a uniform exaggeration of the average group members' contributions by about 25% is not sufficient to overcome the drop in contributions caused by the associated feedback uncertainty. If subjects are in

doubt about the reliability of information they receive, the exaggeration cannot induce a higher level of cooperation in comparison to the perfect feedback condition. In the long run, after the revelation of actual contributions, subjects are even less cooperative if the exaggeration mechanism is further applied. This might be due to the fact that the exaggeration is neither appreciated from a monetary nor from a moral point of view and rather increases the tendency to engage in less moral and more selfish behavior. To disentangle the opposing effects of uncertainty and exaggeration we changed the feedback mechanisms in an additional treatment that is presented in the following section.

4.5 Follow Up: Subject Based Exaggeration

As subjects' contribution behavior to the public good in phase 1 is almost the same in *PF* as in *IF25* although the given information is not the same, there must be a difference in the way the feedback is processed. For this reason we analyzed how subjects adjust their contribution behavior in the next round depending on the feedback they had received. Figure 4.8 shows that in each feedback round contributors can be classified into three types.

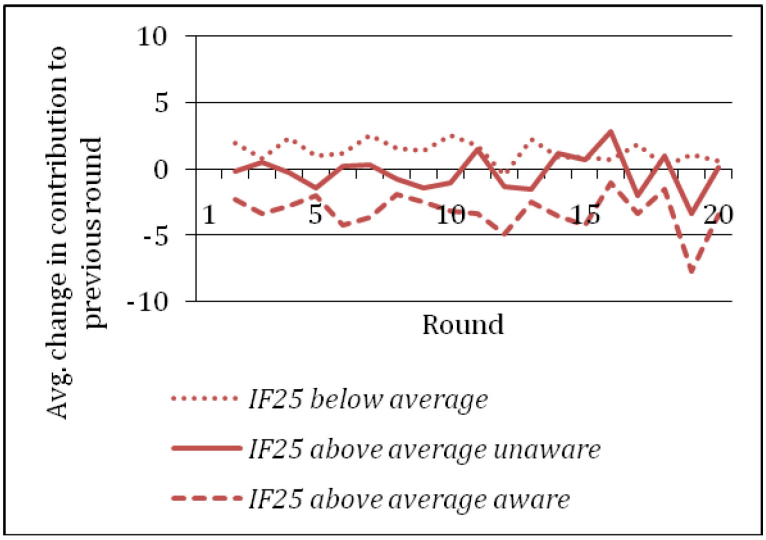


Figure 4.8: Influence of exaggeration on contribution adaption.

Subjects who received the feedback that their input to the public good was *below* the average of the other group members' input do not have the feeling that the other players might have taken advantage of them, i.e. they are no suckers anyway and are called "*IF 25 below average*". These subjects adjust their contributions in the next round slightly upwards by 2-3 points. Subjects who received the feedback that their own contribution was *above* the average of their group members' contribution are the ones who experience the feeling that the other players took advantage of them. These players adjust their next round contributions strongly downwards (by about 5 points). They are called "*IF25 above average aware*" in Figure 4.8. Finally, there are subjects who actually were suckers but who were prevented from knowing it because the 25% exaggeration increased the feedback of the average group members' contribution to an amount that was just above the subject's own contribution. As Figure 4.8 clearly shows, these players, called "*IF 25 above average unaware",* do hardly change their contributions in the next round. The difference in the adjustment to the feedback between "*IF25 above average unaware*" suckers and "*IF25 above average aware*" suckers is significant (p = .016).

Thus, the analysis of the feedback adjustment seems to show that the downward shift is mainly driven by those subjects who experience feedback that points to exploitative behavior of their team mates, i.e. by strong downward adjustment of "*IF25 above average aware*" suckers. In order to test whether this is true, we conducted a

follow up study where all subjects whose contribution was above the group members' average were prevented from realizing that they were the suckers (*IF no suckers*). The experimental design of this treatment is identical to the *IF25* treatment except for the exaggeration mechanism. Instead of exaggerating other group members' contributions uniformly by 25%, the exaggeration in *IF no sucker* was done telling every subject that the average other group members' contribution was at least as high as the subject's own contribution. This resulted in a mechanism that exaggerated the feedback based on each subject's own contribution, taking this value as the minimum. In the case that the subject's own contribution was actually the lowest contribution of that group, the true average contribution of the other group members was announced. Departing from the assumption that suckers were responsible for the decline of cooperation, we predict that preventing subjects from feeling to be the sucker will lead to an increase in cooperation.

Our results show that if no subject has the feeling to be exploited by other group members the downward shift can be avoided and contributions remain on the initial level (see Figure 4.9). Contributions in the IF unaware suckers treatment are significantly higher than the ones in *PF* (p = .001).

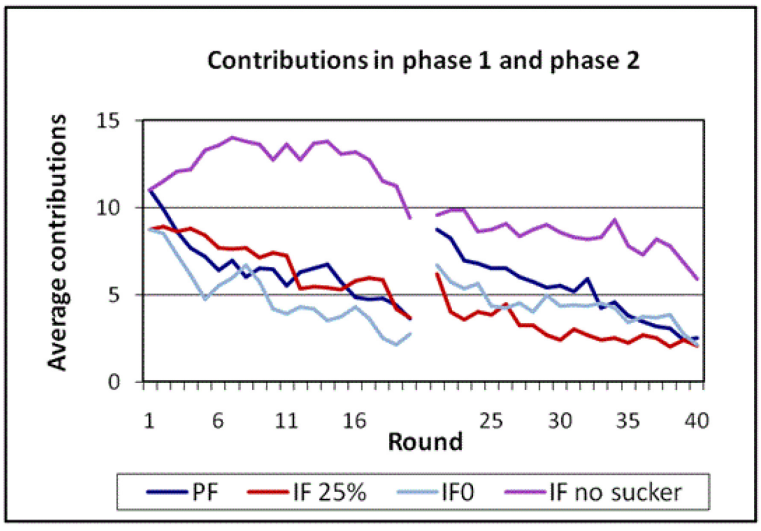


Figure 4.9: Average contributions in *IF no sucker.*

Further, although the informational uncertainty given in the introduction was the same in the *IF25* and the *IF no sucker* treatment, a post hoc calculation shows that the average amount by which group members' contributions were overestimated in *IF no sucker* was only 22.67%. This amount is less than the amount that was necessary to lift

cooperation in *IF25* to the level that was achieved in the control treatment *PF* without uncertainty about the feedback (25%).

Result 5: ***Prohibiting feedback that provokes the feeling to be taken advantage of stabilizes cooperation on a high level and is more efficient in terms of the amount of exaggeration necessary.***

Following the same reasoning as outlined in Prediction 3, we assume that cooperation will decline once the exaggeration mechanism is revealed[16]. In the *IF no sucker* treatment subjects cannot exactly calculate the percentage of the exaggeration because others' contributions are not multiplied by an absolute number but depend on the subject's own contribution. Nevertheless, in phase 2 subjects know that actual contributions are lower than announced and therefore will discount their contributions.

The comparison of the first and the second phase shows that contributions in the *IF no sucker* treatment significantly decline if the exaggeration mechanism is revealed (p = .001). However, the cooperation is still significantly higher in the *IF no sucker* treatment than in the *PF* treatment (p = .001) in the second phase (see also Figure 4.9).

Result 6: When subjects are prevented from realizing that they have been the suckers cooperation in phase 2 is higher than when they have been perfectly informed.

Assuming that this way of exaggerating the feedback increases cooperation despite uncertainty, we expect subjects to evaluate the exaggeration positively from a monetary but negatively from a moral point of view.

[16] The original instruction was: "Please note: The feedback on the others' average contribution in phase 1 was at least as high as your own contribution in each of the 20 periods. In phase 2 will the information about the average contribution of the other three members of your group in the previous period also be at least as high as your own contribution in each of the 20 periods."

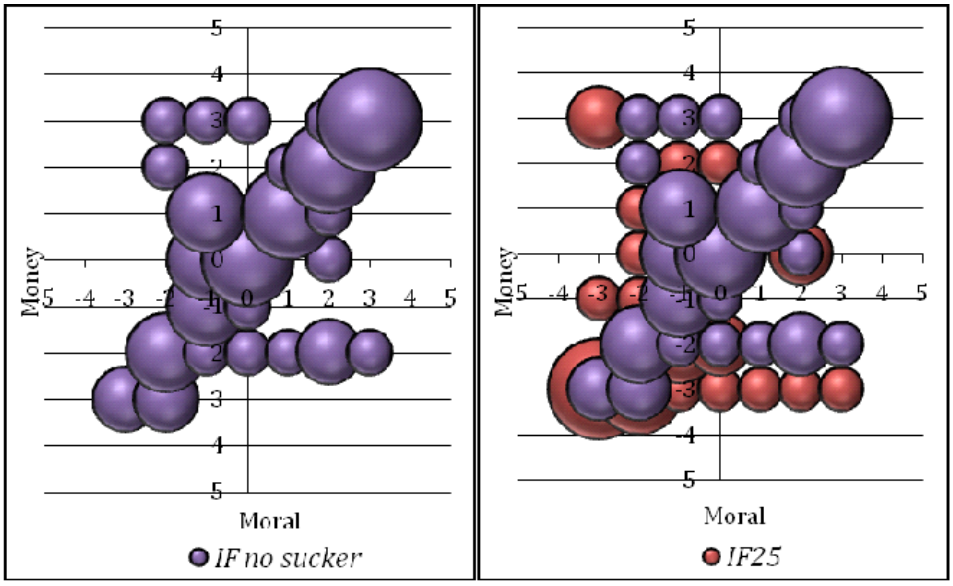


Figure 4.10: Moral and monetary judgments.

Figure 4.10 shows that both moral and monetary judgments of the exaggeration are significantly better in the *IF no sucker* treatment than in the *IF25* treatment (p = .024 and p = .014). The moral and the monetary evaluation of the exaggerated feedback in *IF no sucker* are again not significantly different (p = .955). Instead, moral and monetary evaluations are significantly correlated (r = .515, p < .000). The fact that not only the monetary but also the moral evaluation of the exaggeration is better in the *IF no sucker* treatment and that the two evaluations are correlated suggests that subjects do not regard the exaggeration as bad anymore as soon as their profit is higher. Apparently, subjects realized that the exaggeration mechanism induced more cooperation and appreciated this positive effect. In other words in this case the end seems to justify the means.

Result 7: ***The evaluation of the exaggeration mechanism depends on the consequence that it has for subjects.***

Beliefs

The difference between beliefs and contributions in the first phase is also larger in the *IF no sucker* treatment than in the *PF* treatment (see Figure 4.11, p < .001). The information structure from round 1 to round 20 is the same in *IF* no sucker and in *IF25* because subjects know that the feedback they receive might not be true but they do not

know in what way. Subjects consider this uncertainty in their contribution decision by making a discount from what they believe that their partners contribute.

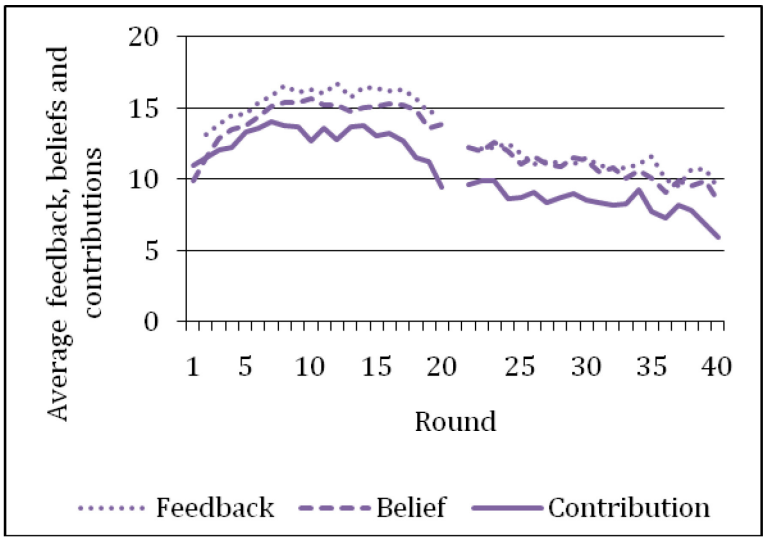


Figure 4.11: Difference between belief and contribution in *IF no sucker.*

In phase 2, subjects in *IF no sucker* behave differently from subjects in *IF25*. In *IF no sucker*, the difference between beliefs and contributions remains from phase 1 to phase 2 (p = .146). Assuming that uncertainty is the major reason for the discount from beliefs to contributions as already outlined before, this finding is not surprising. In *IF no sucker* the uncertainty is equivalently present in phase 1 as in phase 2 because even after the revelation how the exaggeration mechanism works subjects were by design not able to calculate the actual average contribution of the other group members.

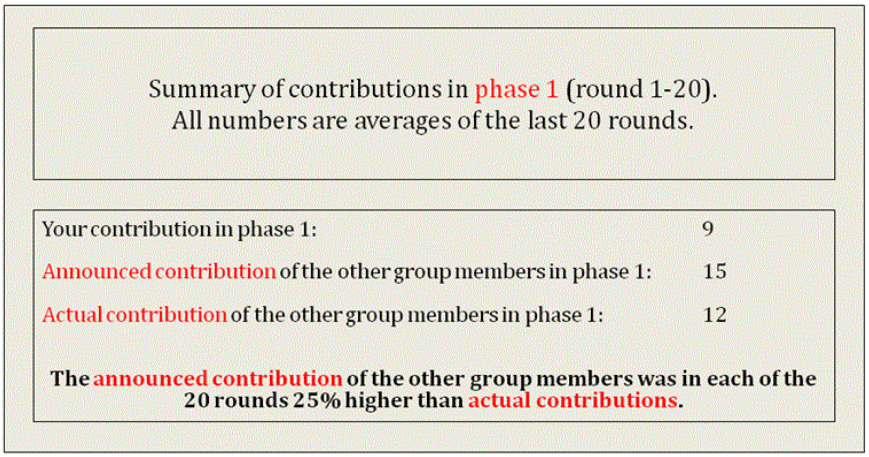
4.6 Conclusion

We study whether the attempt to "paint the world pink" helps to overcome the conflict between individual and collective payoff maximization in a social dilemma situation and analyze the effects in the long run. Assuming that people are conditional cooperative and therefore are more likely to put effort in a task if they know that other group members do so, too, we sugarcoated the feedback about other group members' contributions in a public-good game. Our results show that as long as there is uncertainty about the correctness of the feedback, a uniform exaggeration of 25% about other people's average contributions does not increase cooperation above the level reached in a control treatment without uncertainty about the correctness of the feedback on group members' contributions. In the long run, after the announcement of

actual contributions, a further application of the exaggeration mechanism leads to an even stronger decline in cooperation. The exaggeration is much more effective if it is done contingently on each subjects' own contribution, i.e. if no person feels to be exploited by others. In that case, stable cooperation can be established and even continues once the exaggeration mechanism has become common knowledge. Additionally, this mechanism is more efficient because the necessary amount of exaggeration is smaller.

Appendix

Feedback Screen IF25



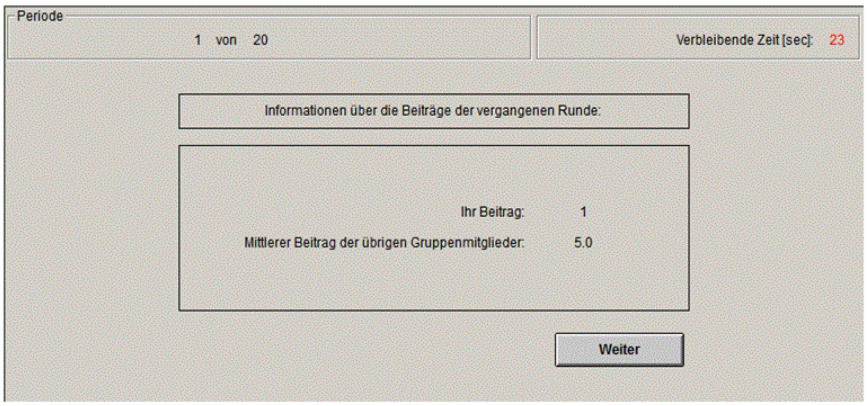
Instructions PF

General information
The experiment consists of **two phases**. First you will be informed about phase 1. Instructions for phase 2 will be announced after the end of phase 1. Your decisions in phase 1 will neither have any influence on the possibilities of your decisions nor on your payoffs in phase 2.

Information for phase 1:
You are member of a group that consists of 4 members in total. During phase 1, you will only interact with members of your group.

Procedure of phase 1
Contributions of group members
Phase 1 consists of **20 periods**. The structure of all rounds is identical.
In **each period** every player receives an endowment of **20 points**.
Every player hast o decide how many of the 20 points he/she wants to **contribute** to the public good.
All points that have been contributed to the public good will be **multiplied** by the factor **1.6** and **equally** split among all 4 players, i.e. every **player receives 0.4 (=1.6/4)** for each point that has been contributed to the public good by a player.
Points that have not been contributed to the public good are kept by the player.

Information about other group members' contributions
From the beginning of the second period you will be informed about the **average contribution** of the other three members of your group in the previous period at the beginning of each period.



Calculation of the payoff per period

- Your payoff in each round consists of two parts:
    - Points that you did not contribute
    - Your share of the public good

Payoff per period
= (Endowment of the period (20) – your contribution to the public good) +
Sum of contributions of **all** members of your group x 1.6 / 4

Example for the case, that **you** contributed **10** and the **other three members of your group contributed 12, 8** and **4** points:
= (20 – 10) + (10 + 12 + 8 + 4) x 1.6 / 4
= 10 + 13.6
= 23.6

Total income from phase 1

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Attention:

No communication is allowed during the experiment. If you have any questions, please give a signal by waving your hand out of the cabin. All decisions are made anonymously, i.e. no participant will be informed about the identity of the participant who made a specific decision. Payments will also be conducted anonymously, i.e. no participant will be informed about the payoff of any other participant.

Good luck!

Information for phase 2:

Phase 2 consists of another 20 periods of the game you played in phase 1. The members of your group will not change.

Information about other group members' contributions

- From the beginning of the second period you will be informed about the **average contribution** of the other three members of your group in the previous period at the beginning of each period.

Total income from phase 2

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Total income from phase 1 and phase 2

Your total income from phase 1 and phase 2 is the sum of payoffs of both phases. At the end of the experiment your total income will be converted into € with an exchange rate of 1 € for 80 points.

Instructions IF0

General information

The experiment consists of **two phases**. First you will be informed about phase 1. Instructions for phase 2 will be announced after the end of phase 1. Your decisions in phase 1 will neither have any influence on the possibilities of your decisions nor on your payoffs in phase 2.

Information for phase 1:

You are member of a group that consists of 4 members in total. During phase 1, you will only interact with members of your group.

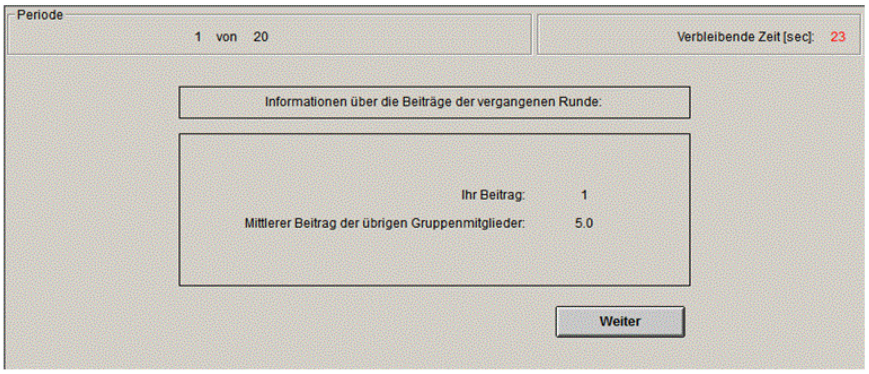
Procedure of phase 1

Contributions of group members

- **Phase 1** consists of **20 periods**. The structure of all rounds is identical.
- In **each period** every player receives an endowment of **20 points**.
- Every player hast o decide how many of the 20 points he/she wants to **contribute** to the public good.
- All points that have been contributed to the public good will be **multiplied** by the factor **1.6** and **equally** split among all 4 players, i.e. <u>every</u> **player receives 0.4 (=1.6/4)** for each point that has been contributed to the public good by a player.
- Points that have not been contributed to the public good are kept by the player.

Information about other group members' contributions

From the beginning of the second period you will be informed about the **average contribution** of the other three members of your group in the previous period at the beginning of each period. **Please note** that this information might deviate from the true contribution!



Calculation of the payoff per period

- Your payoff in each round consists of two parts:
  - Points that you did not contribute
  - Your share of the public good

Payoff per period
= (Endowment of the period (20) – your contribution to the public good) +
Sum of contributions of **all** members of your group x 1.6 / 4

Example for the case, that **you** contributed **10** and the **other three members of your group contributed 12, 8** and **4** points:
= (20 – 10) + (10 + 12 + 8 + 4) x 1.6 / 4
= 10 + 13.6
= 23.6

Total income from phase 1

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Attention:

No communication is allowed during the experiment. If you have any questions, please give a signal by waving your hand out of the cabin. All decisions are made anonymously, i.e. no participant will be informed about the identity of the participant who made a specific decision. Payments will also be conducted anonymously, i.e. no participant will be informed about the payoff of any other participant.

Good luck!

Information for phase 2:

Phase 2 consists of another 20 periods of the game you played in phase 1. The members of your group will not change.

Please note!

The feedback on the others' **average contribution** in phase 1 **corresponded to** the actual average contribution in **each of the 20 periods**.

In phase 2 the information about the **average contribution** of the other three members of your group in the previous period **will also correspond to the average of the actual contribution in each of the 20 periods**.

Total income from phase 2

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Total income from phase 1 and phase 2

Your total income from phase 1 and phase 2 is the sum of payoffs of both phases. At the end of the experiment your total income will be converted into € with an exchange rate of 1 € for 80 points.

Instructions IF25

General information

The experiment consists of **two phases**. First you will be informed about phase 1. Instructions for phase 2 will be announced after the end of phase 1. Your decisions in phase 1 will neither have any influence on the possibilities of your decisions nor on your payoffs in phase 2.

Information for phase 1:

You are member of a group that consists of 4 members in total. During phase 1, you will only interact with members of your group.

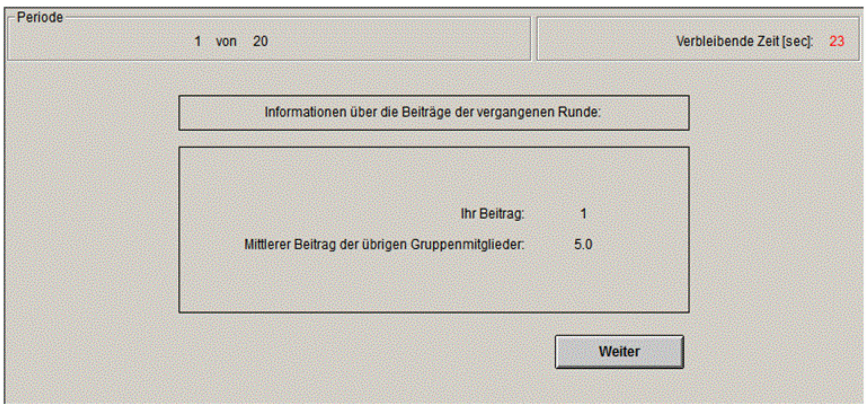
Procedure of phase 1

Contributions of group members

- **Phase 1** consists of **20 periods**. The structure of all rounds is identical.
- In **each period** every player receives an endowment of **20 points**.
- Every player hast o decide how many of the 20 points he/she wants to **contribute** to the public good.
- All points that have been contributed to the public good will be **multiplied** by the factor **1.6** and **equally** split among all 4 players, i.e. <u>every</u> **player receives 0.4 (=1.6/4)** for each point that has been contributed to the public good by a player.
- Points that have not been contributed to the public good are kept by the player.

Information about other group members' contributions

From the beginning of the second period you will be informed about the **average contribution** of the other three members of your group in the previous period at the beginning of each period. **Please note** that this information might deviate from the true contribution!



Calculation of the payoff per period

- Your payoff in each round consists of two parts:
  - Points that you did not contribute
  - Your share of the public good

Payoff per period
= (Endowment of the period (20) – your contribution to the public good) +
Sum of contributions of **all** members of your group x 1.6 / 4

Example for the case, that **you** contributed **10** and the **other three members of your group contributed 12, 8** and **4** points:
= (20 – 10) + (10 + 12 + 8 + 4) x 1.6 / 4
= 10 + 13.6
= 23.6

Total income from phase 1

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Attention:

No communication is allowed during the experiment. If you have any questions, please give a signal by waving your hand out of the cabin. All decisions are made anonymously, i.e. no participant will be informed about the identity of the participant who made a specific decision. Payments will also be conducted anonymously, i.e. no participant will be informed about the payoff of any other participant.

Good luck!

Information for phase 2:

Phase 2 consists of another 20 periods of the game you played in phase 1. The members of your group will not change.

Please note!

The feedback on the others' **average contribution** in phase 1 **was by 25% higher** than the actual average contribution in **each of the 20 periods**.

In phase 2 the information about the **average contribution** of the other three members of your group in the previous period will **also be by 25%** higher than the actual average contribution **in each of the 20 periods**.

Total income from phase 2

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Total income from phase 1 and phase 2

Your total income from phase 1 and phase 2 is the sum of payoffs of both phases. At the end of the experiment your total income will be converted into € with an exchange rate of 1 € for 80 points.

Instructions IF no sucker

General information

The experiment consists of **two phases**. First you will be informed about phase 1. Instructions for phase 2 will be announced after the end of phase 1. Your decisions in phase 1 will neither have any influence on the possibilities of your decisions nor on your payoffs in phase 2.

Information for phase 1:

You are member of a group that consists of 4 members in total. During phase 1, you will only interact with members of your group.

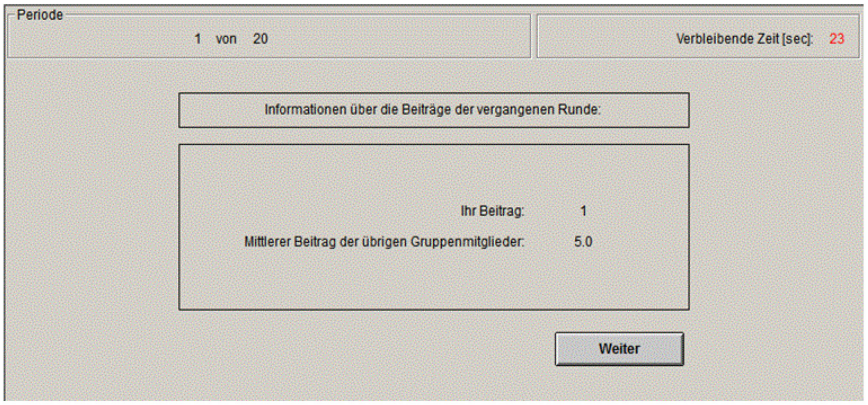
Procedure of phase 1

Contributions of group members

- **Phase 1** consists of **20 periods**. The structure of all rounds is identical.
- In **each period** every player receives an endowment of **20 points**.
- Every player hast o decide how many of the 20 points he/she wants to **contribute** to the public good.
- All points that have been contributed to the public good will be **multiplied** by the factor **1.6** and **equally** split among all 4 players, i.e. <u>every</u> **player receives 0.4 (=1.6/4)** for each point that has been contributed to the public good by a player.
- Points that have not been contributed to the public good are kept by the player.

Information about other group members' contributions

From the beginning of the second period you will be informed about the **average contribution** of the other three members of your group in the previous period at the beginning of each period. **Please note** that this information might deviate from the true contribution!



Calculation of the payoff per period

- Your payoff in each round consists of two parts:
    - Points that you did not contribute
    - Your share of the public good

Payoff per period

= (Endowment of the period (20) – your contribution to the public good) +
Sum of contributions of **all** members of your group x 1.6 / 4

Example for the case, that **you** contributed **10** and the **other three members of your group contributed 12, 8** and **4** points:

= (20 – 10) + (10 + 12 + 8 + 4) x 1.6 / 4

= 10 + 13.6

= 23.6

Total income from phase 1

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Attention:

No communication is allowed during the experiment. If you have any questions, please give a signal by waving your hand out of the cabin. All decisions are made anonymously, i.e. no participant will be informed about the identity of the participant who made a specific decision. Payments will also be conducted anonymously, i.e. no participant will be informed about the payoff of any other participant.

Good luck!

Information for phase 2:

Phase 2 consists of another 20 periods of the game you played in phase 1. The members of your group will not change.

Please note!

The feedback on the others' **average contribution** in phase 1 **was at least as high as your own contribution** in **each of the 20 periods**.

In phase 2 the information about the **average contribution** of the other three members of your group in the previous period **will also be at least as high as your own contribution in each of the 20 periods**.

Total income from phase 2

Your total income from phase 1 is the sum of payoffs of all periods. At the end of the experiment your total income from phase 1 will be converted into € with an exchange rate of 1 € for 80 points.

Total income from phase 1 and phase 2

Your total income from phase 1 and phase 2 is the sum of payoffs of both phases. At the end of the experiment your total income will be converted into € with an exchange rate of 1 € for 80 points.

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Ehrenwörtliche Erklärung

Ich erkläre hiermit, dass ich die vorliegende Arbeit ohne unzulässige Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe; die aus fremden Quellen wörtlich oder inhaltlich übernommenen Stellen habe ich kenntlich gemacht, bei Verwendung eigener Vorarbeiten (Veröffentlichungen und Qualifikationsarbeiten) habe ich auf diese hingewiesen.

Bei der Auswahl und Auswertung des Materials sowie bei der Herstellung des Manuskripts habe ich Unterstützungsleistungen von folgenden Personen erhalten:

1. Prof. Dr. Bettina Rockenbach
2. Prof. Dr. Tilmann Betsch
3. Dr. Cornelia Betsch
4. Thomas Lauer

Die oben genannten Personen sind Co-Autoren der Kapitel 2, 3 und 4. Die genaue Zuordnung der Personen zu den einzelnen Kapiteln ist den Fußnoten zu Beginn der jeweiligen Kapitel zu entnehmen. Weitere Personen waren an der geistigen Herstellung der vorliegenden Arbeit nicht beteiligt. Insbesondere habe ich nicht die Hilfe eines Promotionsberaters in Anspruch genommen. Dritte haben von mir weder unmittelbar noch mittelbar geldwerte Leistungen für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die Arbeit wurde bisher weder im Inland noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde als Dissertation vorgelegt.

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